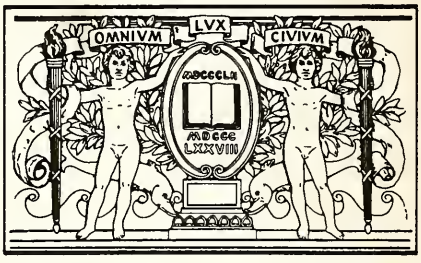

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MEXICAN COPPER TOOLS:

THE USE OF COPPER BY THE MEXICANS

BEFORE THE CONQUEST;

AND

THE KATUNES OF MAYA HISTORY,

A CHAPTER IN THE

EARLY HISTORY OF CENTRAL AMERICA,

WITH SPECIAL REFERENCE TO THE PIO PEREZ MANUSCRIPT.

BY

PHILIPP J. J. VALENTINI, PH. D.

[TRANSLATED FROM THE GERMAN, BY STEPHEN SALISBURY, JR.]

WORCESTER, MASS.:
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1880.

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MEXICAN COPPER TOOLS.

By Philipp J. J. Valentini, Ph.D.

[*From the German, by Stephen Salisbury, Jr.*]

[From Proceedings of American Antiquarian Society, April 30, 1879.]

The subject of prehistoric copper mining, together with the trade in the metal and the process of its manufacture into implements and tools by the red men of North America, has engaged the attention of numerous investigators.

It was while listening to an interesting paper on prehistoric copper mining at Lake Superior, read by Prof. Thomas Egleston before the Academy of Sciences, of New York, March 9, 1879, that the writer was reminded of a number of notes which he had made, some time previous, on the same subject. These notes, however, covered a department of research not included in the lecture of that evening. They were collected in order to secure all the material extant in relation to the copper products of Mexico and Central America. Nevertheless, this treatment of a subject so germain to ours, could not help imparting an impulse to a rapid comparison of the results of our own studies with those of others. It brought to light striking agreements, as well as disagreements, which existed in connection with the copper industries of the two widely separated races. On the one hand it appeared that both of these ancient people were unacquainted with iron; both were trained to the practise of war, and, strange to say, both had invariably abstained from shaping copper into any implement of war, the metal being appropriated solely to the uses of peace.

But, on the other hand, whilst the northern red man attained to his highest achievement in the production of the

axe, the native of Central America could boast of important additions to his stock of tools. He possessed copper implements for tilling the fields, and knew the uses of the chisel. Besides, when he wished to impart to the copper a definite form, he showed a superior ingenuity. The northern Indian simply took a stone, and by physical force hammered the metal into the required shape. But the skilled workman of Tecoatega and Tezcuco, subjecting the native copper to the heat of the furnace, cast the woodcutter's axe in a mould, as well as the bracelets and the fragile earrings that adorned the princesses of Motezuma.

Therefore, in view of the recently increasing interest shown in archæological circles, respecting everything relating to Mexico, the writer deemed it worth while to revise the notes referred to.

As to the fact that the early Mexicans used instruments of copper, there can be no doubt. The brevity of the statements respecting these instruments is nevertheless very perplexing. The accounts of the Spanish chroniclers, indeed, afford a certain degree of satisfaction, but they leave us with a desire for fuller information. We should have felt more grateful to these authorities if, out of the thousand and more chapters devoted to the glorious deeds of the "Castellanos and Predicadores," they had written one in which they had introduced us to the Mexican work-shop, exhibiting the weaver, the paper-maker, the carpenter, the goldsmith, and the sculptor, and initiating us into the devices and methods respectively employed; describing the form and shape of the tools they used, and giving an account of all those little details which are indispensable for achieving any technical or artistical results.

Yet, as it exists, the desired information is incomplete, and, for the present at least, we can only deplore its brevity. In looking for aid from other quarters we feel still more perplexed. No specimen of any copper or bronze tool, apparently, has been preserved, and we are thus prevented

from determining whether the axes or chisels mentioned by the Spanish authors were of the same shape as ours, or whether the natives had contrived to give them a peculiar shape of their own. Finally, no definite hint is given whether the kind of copper metal, which they called "brass or bronze," was copper with the natural admixtures of gold, silver, tin, or other tempering elements, or whether the Mexicans had themselves discovered the devices of hardening, and combined the elements in due conventional proportions.

All these questions are of the highest interest, and claim an answer. Our most renowned authorities for Mexican archæology and history, Humboldt, Prescott and Brasseur de Bourbourg,* pass over this subject without giving any desired satisfaction. They do not go much farther than to repeat the statements furnished by the writers in the same language as they received them.

These early statements will form the principal portion of the material out of which we weave the text of our discussion. In order that the reader may be better prepared to enter into our reasoning and judge of the correctness of our conclusions, we shall, in translation, place the statements of these authors below the text, in the form of foot-notes; though, in cases where it is believed that the reader may desire to see the originals, the Spanish text is given. Considerable help has been derived from a source hitherto very little consulted, that of the native paintings, which represent copper implements. As will be seen, they make up, to a certain extent, for the deficiency of the latter in collections. The cuts we give are of the same size as those we find copied in the Kingsborough Collection.

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* *A. v. Humboldt*, Essai s. l. Nouv. Espagne, Tome III., Livre 4, Chap. ii. *W. H. Prescott*, History of the Conquest of Mexico, Book I., Chap. 5. *Brasseur de Bourbourg*, Hist. d. Nat. Civ. du Mexique, Livre III., Chap. 7, pag. 678.

We shall speak first of those localities whence the natives procured their copper and their tin; secondly, of the manner in which they used to melt metals; thirdly, consider whether the metal was moulded or hammered; and fourthly, discuss the various forms into which their tools appear to have been shaped.

That the natives of the New World collected and worked other metals besides gold and silver, seems to have become known to the Spaniards only after their entrance into the city of Mexico, A. D. 1521. During the first epoch, in which the West India Islands and the Atlantic coasts of South and Central America were explored and conquered, no specimen of utensils, tools or weapons, made of brass or copper, was discovered to be in the possession of the inhabitants. So also in Yucatan, Tlascalla, and on the high plateau of Anahuac, where mechanics and industry were found to have a home, and where the native warrior exhibited his person in the most gorgeous military attire, their swords, javelins, lances and arrows, showed that concerning the manufacture of arms they had, so to speak, not yet emerged from the Stone-Age. And finally, when brass, copper, tin, and even lead, were seen exposed for sale in the stalls of the market-place of Mexico, it was noticed to the great astonishment of the conquerors, that these metals had exclusively served the natives for the manufacture of mere instruments of peace.

The Spanish leader communicates these facts to his emperor in these few words:*—"Besides all kind of merchandise, I have seen for sale trinkets made of gold and silver, of lead, bronze, copper and tin." Almost the same expressions are used in the memoirs of his companion,

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* *Carta (2da) de relacion*, por *Fernando Cortes*, de la villa Segura de Frontera desta Nueva España, á 30 de Octubre de 1520 años "donde hay todos los generos de mercaderias, que en todas las tierras se hallan, asi de mantenimientos como de vituallas, joyas de oro y de plata, de plomo, de *laton*, de *cobre*, de *estano* de piedras, de huesos, etc."

Bernal Diaz de Castillo:*—"And I saw *axes* of *bronze*, and *copper*, and *tin*." Under the influences of such a revelation the hearts of the distressed Spaniards must have been elated with joy and courage, when they saw not only a prospect of replacing the arms which their small band had lost, but also the source from which to equip the faithful Indian allies of Tlascala in an efficient manner. Immediately after having taken firm foothold on the conquered ground, Cortes

---

* *Bernal Diaz de Castillo*, Historia verdadera de la conquista de la Nuevo España, Madrid, 1632, I. Vol., Cap. 92, "y vendian hachas de laton, y cobre y estaño." The meaning of this passage is, beyond all misinterpretation: He saw for sale bronze axes, and besides pieces of copper and others of tin. The order, in which these three words stand, conveys a suggestion that we should not wholly ignore. The word *laton* (bronze) is followed by *cobre* (copper) and *estano* (tin), the two well known components of bronze. Might not the relative position of the three words teach that, to them, bronze was the most important metal and was therefore assigned the first place, mentioning the copper and tin afterwards as the elements from which the bronze was made? We might also go farther and inquire how the first metal came to be recognized by them as bronze. In framing a reply, let us consider three possible explanations. Let us suppose, first, that they knew the bronze well enough to recognize it at once. They, further, may have entertained doubts as to its identity, but finally have been led to this conclusion by seeing the copper and tin exhibited in the stalls, together with the bronze. Thirdly, we may also suppose, that they would desire to obtain more positive confirmation and therefore have inquired and learned from their native guides that this bronze was actually a composition of the two other metals before them. Therefore, considering all these cases, when engaged in composing their narration, the Spaniards would have remembered the circumstances connected with the memorable visit to the market, and have enumerated the metals in the order in which they actually are found; first, the bronze, the main object of their curiosity, and then the copper and tin as the key to the puzzle.

We, however, make no defence of this forced and artificial interpretation of the language, and still less would in this manner build a premise from which to deduce the final conclusion, that the natives make bronze from copper and tin. On the contrary, the facts elicited from our material, as will be seen later, conduct us to very different conclusions. Still, having been struck by the occurrence of the three words and their relative positions, we could not dismiss them altogether, especially as

ordered the goldsmiths of Tezcuco to cast eight thousand arrow-heads of copper, and these weapons were made ready for delivery within a single week * At the same time, too, the hope to have a supply of cannon made was presented to the conqueror's mind. The only question was from whence to procure a sufficient quantity of the material necessary to carry out this design.

Copper is found to-day in nearly all the states of the Mexican Republic. We abstain, therefore, from quoting the localities. But as far as our information goes, no writer or historian has stated where Cortes and before him the natives themselves found it. To investigate this matter might be of direct utility, at least. We intend to use a source hitherto little explored, but which for the history of Mexico is of greatest importance, the picture tables, called the Codices Mexicana. These collections contain representations of their historical, religious, social and commercial life. The writer of this article has made himself familiar with these sources, expecting to find in them disclosures about the location of the ancient copper mines, as soon as he could discover what *copper* was called in the language of the natives. The answer comes in this connection.

The Mexicans had the habit of giving a name to their

Cortes and Bernal Diaz were eye-witnesses and were, therefore, of highest authority. Besides, it is by no means impossible that in the future, instruments of bronze may actually be discovered and found to be composed of tin and copper. In such an event our judgment would favor the opinion that Cortes and his followers were keener observers and investigators than those who during three and one-half centuries have attempted to ventilate the question.

For the same position of words, compare also *Gomara (Francisco Lopez de)*, Historia General de las Indias, Ed. Barcia, Cap. 79: "There is also much featherwork in the market, and gold, silver, copper, lead, bronze *(laton)* and tin, though these three latter metals are scarce." Gomara, it will be noticed, changed somewhat the position of the words, as compilers often do. He was a secretary to Cortes, and his work appeared in Zaragoza, 1552–1553, five years after Cortes' death.

* *Bernal Diaz*, Chap. 147.

towns and districts from the objects which were found in abundance in their neighborhood. Therefore, copper regions ought to bear a name which related to this mineral.

In Lord Kingsborough's Collection, Vol. V., pages 115–124, there are two printed alphabetical indices of the names of all the towns, whose hieroglyphic symbol, or, as we term it, whose coat of arms, is represented in the Codex Mendoza, to be found in Vol. I. of the same collection, pages 1–72. This Codex is arranged in three sections. The first shows the picture-annals of the ancient Aztec-Kings, and the cities which they conquered (pages 1–17). The second reproduces again the coats of arms of these cities, but gives in addition the pictures of all the objects of tribute which these cities had to pay. The third section exhibits an illustration of how Mexican children were trained from infancy up to their 15th year. Sections first and second will claim our interest, exclusively.

Copper, we learn from the Dictionary of Molina* was named in the language of the Nahoa speaking natives, *tepuzque*.† Upon searching in the above quoted Codices, we find three names of towns which are compounds of this

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* Vocabulario en la lengua Castellana y Mexicana, por el Rev° Padre Fray *Alonso de Molina:* Guardian del Convento de San Antonio de Tezcuco, de la Orden de los Frayles Menores. México, 1572. This edition was preceded by a smaller one, 1552, which was the *fourteenth book* in the series of those which were printed in Mexico.

† Let us quote from Bernal Diaz, Chapter 157, without any comment, the following anecdote concerning the word *tepuzque*. "In the smelting of gold there was also allowed an eighth of alloy to every ounce to assist the men in the purchase of the necessaries of life. But we (the soldiers) derived no advantage from this, but on the contrary, it proved very prejudicial to us, for the merchants added the same percentage to the price of their goods and sold for five pesos what was only worth three, and so this alloy became, as the Indians term it, tepuzque or copper. This expression became so common among us, that we added it to the names of the distinguished cavaliers to express the worth of their character, as, for instance, we used to say, Señor Don Juan of so much tepuzque."

word *tepuzque*. Their names appear in the following form: Tepoztla, Vol. I., page 8, fig. 2, and the same name on page 26, fig. 13. Tepoztitla, page 42, fig. 10, and Tepozcolula, page 43, fig. 3.

The cuts 1, 2, 3 and 4, are faithful reproductions of the coats of arms belonging to these towns.

Cut 1.

Tepoztla.

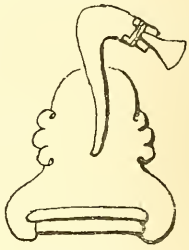
Cut 2.

Tepoztla.

Cut 3.

Tepoztitla.

Cut 4.



Tepozcolula.

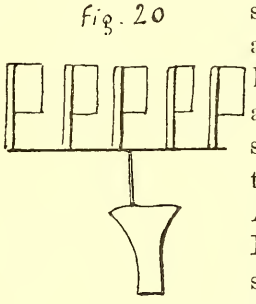
There cannot be any doubt as to the meaning of the objects represented by these pictures. They mean axes. Their handles appear in a curved form, the blades at their cutting edges are somewhat rounded, and the tenons of the blades are inserted below the top of the handles. Both handles and blades are painted in a reddish brown color, the wood as well as the copper.

The differences between the pictured representations are the following: Cuts 1, 2, and 4, show the axes growing out from the top of a mountain, whilst the axe of cut 3 appears by itself. Further, the axes of cuts 1 and 2, those of *Tepoztla*, show something applied to the handle, which in cut 1 we recognize to be a single bow-knot, and in cut 2 the same girdle with a bow-knot, yet wound about a dress of white color, embroidered with red spots. A notable difference, however, will still be noticed between the form of the axes in cuts 1, 2, 3, and that in cut 4, or *Tepozcolula*. We shall speak of this latter, on a later page, as an instrument very closely related to the other axes.

By means of these pictures we arrive at the knowledge of the following facts: Copper was undoubtedly found in the neighborhood of the three named cities. Moreover, copper in these cities was wrought into axe-blades. Finally, the axe will turn out to be the symbol used for copper, in general.

Let us accept these facts and see whether this picture for the symbol for copper does not return on other pages of the same Codex, and thereby gain more information on the subject. We notice the picture of the axe-blade reappearing on the pages 39 and 42. Both happen to bear the same number, that of figure 20, and both belong to the same section of the Codex which contains the pictures of the tributes paid by the conquered towns. Cut 5 is a reproduction of fig. 20, page 39, Codex Mendoza. It shows the metal axe without a handle hanging on a thread from a line upon which we see five flags are painted. Moreover, at the left side is a little picture. A flag in Mexican symbol writing signifies the number twenty.*

Cut 5.



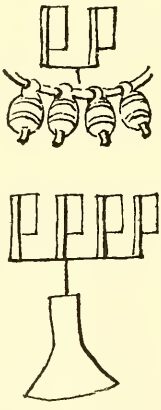
Town of Chilapa.

* Those who wish to be more extensively instructed in the Mexican system of numeration can read: *Leon y Gama*, Descripcion Hist. y Cronol. de las dos Piedras, Parte II., Appendice II., page 128, Edit. C. M. de Bustamante, Mexico, 1832. *Clavigero*, Storia antica di Messico, English translation by Ch. Cullen, London, 1807, Vol. I., Book 4, pag. 410; and an article recently published by *Orozco y Berra*, in Tom. I., Entrega 6ma of the Anales del Museo Nacional de Mexico, 1879, page 258, which article is the most complete hitherto written on the subject, and is illustrated by 53 cuts.

We may therefore conclude that by this combination one hundred copper axes are indicated. The question now arises, what city may have paid this tribute of copper axes? The painter has not only omitted to connect directly these flags and axe with one of the various coats of arms that are grouped in their neighborhood, but even, if he had done so, the student, still unacquainted with the art of explaining pictures, would be unable to make out the name of the city, embodied in the picture of the coat of arms. We will overcome this difficulty by consulting the interpretation of the Codex Mendoza, which is printed on the pages 39–89 of Vol. V., Kingsb. Collection. There, on page 73, the suggestion is given that the tribute objects refer to the town of Chilapa, whose coat of arms (fig. 2), as we shall notice on the cut, consists of a tub filled with water, and on whose surface the *chilli*-fruit appears, better known as the Spanish red pepper *chilli*, red peper, *atl*, water, *pa*, in or above. For this reason we learn that the town of *Chilapa* was tributary in 100 axes.

In like manner we may proceed with the definition of the picture found on page 42, fig. 20. The copy given in cut 6, shows 80 blades of copper axes in fig. 20, and besides 40 little copper bells in fig. 19, and the interpretation, Vol. V., page 76, informs us that it was the town of Chala, fig. 26, which had to pay this kind of tribute.

Cut 6.



Town of Chala.

Therefore, the towns of Tepoztla, Tepotztitla, Tepozcolula, and, besides, those of Chilapa and Xala, must be considered to have been connected, in

one way or the other, with copper mining, copper manufacture, and the tribute of the same.*

A few words on the procuring of the metal from localities where it was discovered by the natives, may find a suitable place here. Mining, as we understand it to-day, or as the Spaniards understood it already at the time of the conquest, was not practised by the natives. Gold and silver were not broken from the entrails of the rocks. They were collected from the *placeres* by a process of mere washing. No notice at all has come down to us how copper was gathered. We can, however, easily imagine, that whenever by a chance outcropping a copper vein or stratum became visible, they probably broke off the ore or mineral to a depth easy to be reached, and only selected the most solid pieces. It is evident that the results of such superficial mining must have been very trifling, certainly not greater than would barely suffice for the fabrication of the most necessary tools. Herein we will find an explanation, why this people, though possessing the metal and the technical skill, nevertheless did not use it for the manufacture of arms. The production could not have been abundant enough to supply the whole nation or even the professional soldier with metal weapons. They preferred therefore, to continue in the ignorance of the Stone Age.

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* There is, indeed, one passage in *Herrara (Antonio de)*, Hist. Gen. de los hechos de los Castellanos, Madrid, 1729, in his introductory Descripcion de las Indias, §§ Zacatula and Colima, where the working of copper mines by the indigenous people of these provinces is mentioned: "There are very abundant copper mines in this district, more towards the East, and near the port of Santiago. The Indians make *marvelous vessels (vasos)* of this copper, because it is sweet *(dulce)*. They have, however, still another kind of copper, which is hard, and which they employed for tilling the ground, instead of using iron, for they were not acquainted with iron before the Spaniards entered the kingdom." As will be seen later, there is no doubt as to the latter assertion. But we fear the former to be an anachronism and the manufacturing of *vasos de cobre* (copper vessels) will have to be assigned to the epoch after the Conquest, when the art of hammering was introduced and eagerly accepted and practised by the natives.

Where the Mexicans found the *lead* that was seen in the market-place, nay, even the purposes for which they might have used it, we have been entirely unable to learn. *Lead* in the language of the Nahoas, is called *temeztli* (telt stone, metzli moon), moon stone, a name picturesque and characteristic, as were most of those which stand in the list of objects that belong to the realm of nature. Not a single picture referring to lead can be found in the Mexican Codices. The same must also be said of *tin*, the name of which was *amochictl*, a word seemingly Nahoatl in form, but whose root was probably derived from a foreign language. It will be gratifying, however, to learn from the pen of the great conqueror Cortes himself, where the natives, and afterwards his followers, found their *tin*. To quote the language of Cortes,* "I am without artillery and weapons, though I have often sent money to obtain them. But as nothing drives a man to expedients so much as distress, and as I had already lost the hope that Your Royal Majesty might be informed of this, I have mustered all my strength to the utmost in order that I might not lose what I have already obtained with so much danger and sacrifice of life. I have therefore arranged to have men immediately sent out in search of copper, and in order to obtain it without delay I have expended a great amount of money. As soon as I had brought together a sufficient quantity, I procured a workman, who luckily was with us, to cast several cannons. Two half-culverines are now ready, and we have succeeded as far as their size would permit. The copper was indeed all ready for use, but I had no *tin*. Without *tin* I could do nothing, and it caused me a great deal of trouble to find a sufficient quantity of it for these cannons, for some of our men, who had tin plates or other vessels of that kind, were not willing to part with them at any rate. For this reason

* Carta de Hernan Cortes al Emperador, de la grau ciudad de Tenochtitlan, desta Nueva España, a 13 dias del mes de Octubre de 1524. Edicion *Gayangos* (Don Pascual de), Paris, 1866.

I have sent out people in all directions searching for tin, and the Lord, who takes care of everything, willed graciously that when our distress had reached its highest point, I found among the natives of *Tachco** small pieces of tin, very thin and in the form of coins.† Making further investigations I found that this tin, there and in other provinces was used for money, also that this tin was obtained from the same province of *Tachco*, the latter being at a distance of 26 leagues from this town. I also discovered the locality itself of these mines. The Spaniards whom I despatched with the necessary tools brought me *samples* of it, and I then gave them orders that a sufficient quantity should be procured, and, though it is a work of much labor, I shall be supplied with the necessary quantity that I require. While searching for tin, according to a report from those skilled in the subject, a rich vein of iron-ore was also discovered.

Now supplied with tin I can make the desired cannons, and daily I try to increase the number, so that now I have already five pieces ready, two half culverines, two which are still smaller, one field-piece and two *sacres*, the same that I brought with me, and another half-culverine which I purchased from the estate of the Adelantado Ponce de Leon."

In the above report of Cortes, therefore, we are informed of the name of the locality where tin was found and dug by the natives. So we have the facts established that both copper and tin‡ were dug by the natives, that there was a

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* Tachco, to-day Tasco, at a distance of 25 miles, S. S. W. from the Capital. A. v. Humboldt visited the memorable spot. See Essay s. l. Nouv. Espagne, Livre IV., Chap. xi.: "At the west of Tehuilotepec, is the Cerro de la Campañia, where Cortes began his work of investigation."

† The words of the text are: "Ciertas pieçeçuelas dello, a manera de moneda muy delgada, y procediendo por mio pezoquiza, halle que en la dicha provincia y aun en otras, se trataba por moneda."

‡ In Molina's vocabulary a suggestion can be found for what technical purposes *tin* might have been employed. The word *teputzlacopintli* is

traffic in them at that time, that Cortes himself succeeded in getting at the mines from which they were extracted, and that he had not been mistaken in his former recognition of their display for sale in the public market.

But before these ores could be shaped into the above named commercial forms, it is clear that they still needed to undergo a process of smelting. As to the peculiar mode of smelting pursued by the natives, we have not been able to find any distinct reference in the writings of the chroniclers. It does not appear that the ancient Mexicans understood the method of the Peruvians of melting their copper in furnaces exposed to the wind on the lofty sierras, but we may form for ourselves an idea of how they proceeded from a picture in Codex Mendoza, page 71, fig. 24.

Cut 7 gives a faithful reproduction.

Cut 7.

Smelting Gold.

In the midst of an earthen tripod, surrounded by smoke and flames, we perceive a small disk of a yellow color. Our attention is called to the peculiar mark imprinted on the surface of the disk. Upon searching in Lord Kingsborough's Collection, Vol. V., page 112, plate 71, where the interpretation of the little picture is given, we learn, that the man sitting by the tripod, is meant to be a goldsmith. Hence we conclude the disk must be understood to mean a round piece of gold, and that very probably the mark printed on it, was the usual symboli-

---

translated with cañuto de estaño, para horadar piedras preciosas (cylinder of tin for perforating precious stones). We may, therefore, presume that the holes bored through the well known green jade trinkets, were drilled by the aid of the mentioned cañuto de estaño.

cal sign for gold.* At the right of the tripod sits a man wrapped in his mantle, no doubt the master of the workshop; for the addition of a flake flying from his mouth, as the typical sign for language or command, gives us a right to suppose that we have before us the so-called *temachtiani*, or master of the trade. At the left side crouches the apprentice, *tlamachtilli*. He holds in his right hand

* This little figure symbolizing gold, recurs only once more in all those Mexican paintings which we have been able to examine. It stands in Vol. I., Kingsb. Collection, Cod. Mendoza, page 13, fig. 4, and is identical with that represented by the engraving. We do not venture too far in asserting that the symbol on this gold piece represents a genuine Mexican numeral. It is composed of a cross, having a dot in each of its quadrants. This cross is the well known symbol of the number 8000 *(xiquipilli)*, and each dot stands for the number 1. We have thus expressed four times 8000 (nahui xiquipilli) or 32,000. Here, however, the interpretation ends, so far as it may be based upon accepted authorities. Whatever else there is to be learned concerning this number 32,000, found on the gold piece, must be derived by the confessedly hazardous process of induction.

Nevertheless, let us try this process and ascertain what the number 32,000 actually refers to. In answering this question it may, perhaps, fairly be assumed that the number stands in a direct relation to a certain numerical unity, like that in which hundreds stand to the tens, 100 : 1. Such a numerical unity, however, presupposes the existence of some tangible equivalent, which in Mexican commerce, if it was not some small piece of metal, would have had some other conventional representation, either in merchandise or in labor. If such a unity actually existed it is clear that its value must have been fixed either by weight or by measure. There is, however, no positive proof that such a unity, fixed by weight or measure, ever existed among the Mexicans. Cortes, in the above quoted letter, pretends that it was impossible for him to detect the use of any weights or scales, and no writer after him has touched this question or given any other decision. Respecting measures, there is no direct testimony at all. But, on the other hand, it is hardly to be imagined that these people, of whose religious administration and social polity we have such abundant evidences, should have been deficient to such an extent in the department of their commercial polity as not to have found any method by which the proportion between the value of the precious metal to merchandise in all its forms was to be expressed. We must guard ourselves against the fallacy that because we are not acquainted with the method it could not have existed. There are grounds to believe that Cortes was right in saying that the Mexicans did not know

a staff, one end of which is in his mouth and the other is placed in the crucible. *Tlapitzqui*, in the Nahoatl language means at the same time a flute player and a melter of metal. This etymological version therefore conveys the idea, that the staff held by the smelter signifies a pipe or tube used for increasing heat by blowing the fire, as the staff is similar to a long pipe or flute and is held in the

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the use of weights (their vocabulary does not show any word answering to peso, pesilla, libra, balanza romana), but, we think they knew perfectly the use of measures (the vocabulary gives about twenty words for all varieties of this operation); and in regard to a certain unity of measure employed in gold transactions, there are indications given by other trustworthy writers that this unity might be detected in the quills, of conventional length, and probably of conventional diameter, which quills were filled up with grains of gold dust, by the color and shades of which they graduated the respective value. Bernal Diaz, Chapter 92: Antes de salir de la misma plaza, estaban otros muchos mercaderes, que, segun dixeron, era que tenian a *vender oro en granos* como lo sacau de las minas, metido el oro en unos *canutillos* delgados de los anserones de tierra (thin goose quills) e asi blancos porque se pareciese el oro por defuera, y por el *largor* y *gordor* de los canutillos (length and width of the quills) tenian entre ellos su cuenta (they made up their account) que tantas mantas o que xiquipiles de cacao salia o qualquier otra cosa a que lo trocavan.

This point being settled let us next introduce one other, for it will contribute to strengthen the probability that besides the quill there existed still a lower unity, that of the grain of gold itself, by which they counted. For this purpose, let us turn again to the gold piece represented in the painting. It is round. This reminds us of what was told by Cortes of the little pieces of *tin* discovered in Tachco, which, he said, were used as coins. Likewise, we read in Bernal Diaz that Motezuma used to pay with pieces of gold when he lost in playing *patol* (trictrac) with his Spanish jailors. The word employed by the author and eye-witness of the game, is "*tejuelo*," which, according to Spanish usages and the dictionaries of their language, signifies: a round piece of metal. The author moreover informs us of the value of this tejuelo. It was 50 ducats of weight and must, therefore, have been equivalent to, at least, one hundred dollars of gold. Since Bernal Diaz in this entire passage wishes to express his highest esteem for Motezuma on account of the princely generosity with which he paid even those whom he knew had cheated him, we may fairly conclude that these tejuelos were not the lowest, but rather the highest, gold pieces that he had at his disposal. Should we now remember the number, 32,000, which is the highest found

mouth of the workman. In his left hand he holds a similar staff, but there is no means of recognizing whether it is a stick for stirring the embers, or a tube to be used alternately with the other. Now, we shall be permitted to draw a conclusion from this process of smelting gold as to the manner of smelting copper. The process must have been exactly the same with both. For, if the Mexican goldsmith, with the aid of a blowpipe, was able to increase the heat of the fire to such a degree as to make gold fusible, a heat which requires 1,100° C., he cannot have found greater difficulties in melting copper, which requires nearly the same degree of heat; and tin, which is far more easily fusible, could have been treated in the same way.

Melting was followed by casting into forms or moulds, and these moulds must have been of stone. This might be concluded from the language of Torquemada and Gomara.* The words "*by placing one stone above another*

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represented in Mexican pictures (they generally never exceed that of 8000, the *xiquipilli*), it is not at all improbable that the Motezuma-tejuelo, about 100 dollars worth, might have been equivalent to 32,000 unities, while this unity may have been one grain of gold. For if we would divide 100 dollars of gold into 32,000 equal parts, or still farther divide one gold dollar into 320 equal parts, each part would represent a very small portion of gold, but still large enough to be counted separately with the finger. This was the way the gold-dust was collected on the placeres, not by men but by women and children. The procedure was primitive, indeed, in the highest degree. In such a way, however, gold gathering was undoubtedly practised in the first stage of men's civilization. If not written in history, yet the linguistical testimony bears witness to it. We find the expression "*grain of gold*" to be the common property among the ancient and modern nations in connection with commerce and the weighing of gold.

* *Torquemada* (Fray Juan de) Monarquia Indiana, Madrid, 1613, Vol. II., Book 13, Chapter 1. "The goldsmiths did not possess the tools necessary for hammering metals, but with one stone placed above another one, they make a flat cup or a plate." (Pero con una piedra sobre otra hacian una taza llana y un plato.) *Gomara, l. c.* "They will cast a platter in a mould with eight corners, and every corner of several metals, that is to say, the one of gold, the other of silver, without any kind of solder. They will also cast a little caldron with loose handles hanging

one," are too clear to leave the least doubt as to what the author meant. This process will account for the absolute identity we had the opportunity to observe existing between certain trinkets of the same class, coming chiefly from Nicaragua and Chiriqui. No specimens of a mould, however, have come to our view, or have been heard of as existing in any collection, probably because whenever they were met by the "*huaqueros*," they did not recognize them as such, and threw them away.

The scanty knowledge we have of all these interesting technical details will not be wondered at, if we consider that we derive it from no other class of writers than from unlearned soldiers, and monks unskilled in the practical matters of this world. But still, the principal reason for this want of information is that the Mexican artist was as jealous in keeping his devices secret, as the European. They also formed guilds, into which the apprentices were sworn, and their tongues were bound by fear as well as interest. Let us quote only one instance. The Vice-King

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thereto, as we used to cast a bell. They will also cast in a mould a fish with one scale of silver on its back and another of gold; they will make a parrot of metal so that his tongue shall shake and his head move and his wings flutter; they will cast an ape in a mould so that both hands and feet will stir, and holding a spindle in his hand, seeming to spin, yea, and an apple in his hand, as if he would eat it. Our Spaniards were not a little amazed at the sight of these things, for our goldsmiths are not to be compared to theirs." *Bernal Diaz, Chapter* 91. "I will first mention the sculptors and the gold and silversmiths, who were clever in working and smelting gold, and would have astonished the most celebrated of our Spanish goldsmiths; the number of these were very great and the most skilful lived at a place called Azcapotzalco, about four leagues from Mexico." *Petrus Martyr, Decade VI., Chapter* 6. (A letter written to Pope Adrian VI.) "The chief noblemen's houses (in Nicaragua) compass and inclose the King's street on every side; in the middle site whereof one is erected, in which the goldsmiths dwell. Gold is there molten and forged (?) to be formed into divers jewels, and is formed into small plates or bars, to be stamped after the pleasure of its owners and at length is brought into the form and fashion they desire, and that neatly too."

Mendoza reports to the Emperor* that he offered to pardon one of those workmen, if he would disclose how he was able to counterfeit the Spanish coins in so striking a way. But the native preferred to remain silent and was put to death.

Here is the place for asking the question: Would not the early Mexicans, aside from their practice of casting the above metals, have employed also that of hammering? Our reply would be emphatically in the negative, if taking the expression "hammering" in its strict meaning, which is that of working with the hammer. The writers of the Conquest have left the most explicit testimony, that the natives, only after the arrival of the Spaniards became acquainted with this instrument, and with the art of using it for working high reliefs out of a metal sheet. Moreover, the native vocabulary has no word for the metal hammer as it is commonly understood. Yet the wooden mallet was known, the so-called *quauhololli*, and used by the sculptors. In the gradual education of mankind in technical knowledge, beating of metals, of course, must have preceded casting. The ancestors of the early Mexicans, at a certain epoch, stood on the same low stage of workmanship as their more distant northern brethren. But when the inventor of the mould had taught them how to multiply the objects most in demand, by the means of this easy, rapid and almost infallible operation, we must not imagine that he had done away entirely with the old practice of beating and stretching metal with a stone. The practice, in certain cases, would have been maintained: as for instance, when a diadem, a shield, or a breastplate was to be shaped, and on occasions when the object to be made required the use of a thin flat sheet of metal. Such objects are not only described by the writers, but are also represented by the

* Lorenzana (Don Franc, Antonia de) Historia de Nueva España, page 378, Note 2.

native painters. A specimen of such a kind is mentioned, which on account of its extraordinary beauty, workmanship and value left a deep impression on the conquerors. It was the present which Motezuma made to Cortes at his landing, on the *Culhua* coast, "the two gold and silver wheels;" the one, as they said, representing the Sun, the other the Moon. According to the measures they took of them, these round discs must have had a diameter of more than five feet. It is preposterous to imagine that round sheets of this size should have been the product of casting.*

We pass on now to discuss the various tools which we have reason to think were cast in copper or in bronze, by the early Mexicans.

The *axe* stands in the first place. Cortes, we shall remember, omitted to specify any of the objects which he saw exposed for sale in the market-place. Not so his companion, Bernal Diaz. He, after a lapse of 40 years, when occupied with the writing of his memoirs, has no recollection of other tools, which he undoubtedly must have seen, except the much admired bronze axes. Specimens of these were sent over to Spain in the same vessel on which the above mentioned presents to the Emperor were shipped. At their arrival at Palos, Petrus Martyr of the Council House of the Indies was one of the first to examine the curiosities sent from the New World, and to gather from the lips of the bearers their verbal comments. His remarks on the axes he had seen, are "with their bronze axes and hatchets, cunningly tempered, they (the Indians) fell the

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* See *Bernal Diaz, Chap.* 39.

Petrus Martyr de Angleria, English edition of Eden, Islands of the West Indies, page 169: "Circumference of xxviii spans *(spithamarum* 28*)*."

Torquemada Mon. Ind., Lib. IV., Cap. 17.

Three letters on Cortes' landing in Yucatan, edited by *Fredric Muller*, Amsterdam, 1871. (1) Their width being seven spans, (2) larger than a wagon's wheel, and made as if beaten out of white iron. (3) Two wheels, the one of gold and weighing 30,000 castellanos, the other of silver, weighing 50 mark. These pieces are as large as a millstone.

trees." There are three expressions in this passage which will claim our attention. First, we learn that two classes of axes were sent over, one of which Martyr recognized as a "*secūris*," the other as a "*dolabra*," hence a common axe, and another which was like a pick or a hoe. Further on we shall give an illustration of these axes, taken from the pictures of the natives, when we are to recur again to this subject. Our author, in the second place, describes the two axes as of bronze, for this is the English rendering of the Latin expression: *aurichalcea*. Thirdly, we learn, that the blades were "cunningly tempered" or "*argute temperata*." This language requires explanation.

The attentive reader will remember what has been said respecting Cortes and Bernal Diaz, whether they recognized the bronze objects in the market as a mixture of copper and tin, of themselves, or whether they had been inquisitive enough to ask for information, and in consequence learned that it was a common practice among the workmen to mix these two metals, in certain proportions, in order to produce a harder quality of copper. The latter hypothesis seems to gain a certain corroboration from Martyr's language. For there cannot be the slightest doubt as to what he meant when putting down the words "cunningly tempered." He wished to express the idea, that he had positive grounds for the conviction, that the metal of which the axes were made, was not a *natural* but an *artificial* product. What grounds for this conviction he had, he does not, however, communicate to his reader.

Our author has the well deserved reputation of being one of the fullest authorities for all that concerns the discovery and conquest of the western hemisphere. Of all, however, that he has written, the pages containing the landing of Cortes in Yucatan, and the entrance of the Spaniards in the capital of Motezuma, appear to have been the most attractive to the general reader and the student; these pages being torn and soiled in the existing copies of his original

Latin, as well as of its translation into foreign languages. We mention this circumstance, for it is not without a certain bearing upon our question. It proves how confidently the reading public has drawn upon the author's statement, and how eagerly students have sought to digest his amazing accounts, quite unsuspicious, however, of the errors in dates as well as facts; admiring rather than criticizing the pompous phraseology of his mediæval Latin, or his often very suggestive but somewhat flighty speculations. In Petrus Martyr, therefore, we may recognize the originator of the widespread theory that the Mexicans possessed the secret of manufacturing bronze in the highest perfection and in accordance with metallurgical rules. We are, however, forewarned. The statement is of importance, and must be weighed before accepting it. We fear it will fail like many genial but unsupported inspirations, of which our author was susceptible. If we ask whence he derived the notion that the bronze tools were "argute temperata" we shall find that he failed to give any authority. Petrus Martyr, whom we often find quoting the full names and special circumstances by the aid of which he gathered the material for his historical letters, does not follow this laudable practice on this occasion, even though the matter was one of importance to investigators like himself. For these instruments of bronze, and many other tools sent over, must have been, in another way, still more interesting to him than the objects of industry themselves. These tools afforded the most palpable proof of an independent industry practised by that strange people beyond the sea; they were a key perhaps also to the riddle, how it was possible to perform those marvels of workmanship. This silence of Petrus Martyr respecting the details of the "*argutia*" which he professes that the natives employed in manufacturing their bronze is so much the more striking, since we find him enlarging a long while upon their manufacture of paper; and he shows himself correctly informed respecting that

process. It is clear that the one was as well worth detailing as the other. Therefore we cannot help expressing the suspicion, that whilst he had correct information respecting the one, he had none respecting the other.

It would, however, be venturing too much to reject so important a statement merely on the grounds alleged. In order to save it, we could fairly say, that he omitted his references through carelessness. Accepting this position, let us then seek to ascertain, who his informants might have been, and chiefly inquire what they were able to tell him about the manufacture of bronze in Mexico.

The circumstances accompanying the arrival of the precious gifts from the capital at the Camp of Cortes, their shipping and unlading at Palos, and their registration at the custom-house, are perfectly known. From them we gather the following points: First, no Spaniard had yet set foot in the interior, they were still loitering on the shores of Vera Cruz, where the embassies of Motezuma made their appearance. Hence, they were still shut off from the opportunity of inspecting the workshops of Tezcuco, Mexico and Azcapotzalco, the centres from which this special class of merchandise was spread over the whole isthmus. Cortes, who had many reasons for hastening the transfer of the precious treasures to the ships, without much delay despatched one of them, intrusting two of his friends, Montejo and Puerto Carrero, with the mission of presenting to the Emperor the report of his startling discoveries and the presents coming from the new vassal-king. Petrus Martyr, indeed, mentions these two cavaliers, as being Cortes' messengers, and it is highly probable that it was from their lips that he gathered among other correct information also that about the manufacture of paper. The special kind of paper he describes, is one which was manufactured and used exclusively on the coast of Yucatan and Vera Cruz, not the paper of the magney-plant which grows on the high plateaus, but that of the amatl-tree, a native of the

tierra caliente. Being in the very country where this kind of paper was manufactured, the Spanish writers, therefore, had the opportunity of hearing how paper was made, even, possibly, of seeing the process itself, which they had not enjoyed in the case of bronze. Could they have got the information from the mouths of the embassadors? We know they held shyly aloof. The intercourse was very ceremonious, and difficult besides, since the conversation passed through the two native languages, and we cannot fairly imagine that the technical question of manufacturing bronze should have become one of the topics of inquiry. Moreover, we do not believe that special attention would have been paid to these bronze implements, if we consider the overpowering impression which the richness and rareness of the other objects must have caused them. Finally, would they not have believed the yellow metal to be gold? since they dreamt of nothing else, and were far from imagining that the opulent ruler of Mexico would have made their Emperor a present of poor bronze tools.

We are not able to offer any conclusive evidence against the remarkable statement made by Petrus Martyr. We are fully aware how many positive proofs are required to render it totally invalid. But we deemed it to be our duty not to withhold from our readers the many grave doubts we entertain against its too ready acceptance. We have still to add, that this statement stands isolated and without support in the whole literature of the Conquest. His contemporary writers, indeed, occasionally speak of copper axes that were tempered by an alloy. None of them, however, goes so far as he, to impute to the early Mexicans the preparation of an artificial bronze, as was so manifestly implied by the words, *argute temperatis*.

The passages which speak about the axes used by the natives are cited below*. Three kinds are mentioned, stone,

* *Bernal Diaz, Chap.* 92: "Bronze axes, and copper and tin." *Petrus Martyr, Dec. V., Chap.* 10: "Bronze axes and edges, cunningly tempered."

copper and bronze axes. The first of them must have been in use among such tribes as lived outside of the circle of Mexican trade and civilization, or among those which intentionally held themselves aloof. For its retention and use the complete absence of ores in certain districts may have had a decided influence, as for instance was the case with the peninsula of Yucatan.* The shape of the Yucatecan

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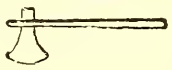
Gomara, Chap. 210: "They also have axes, borers and chisels of copper mixed with gold, silver or tin." *Landa Rel., d. l., Cosas de Yucatan*, Ed. Brasseur, Paris, 1864, pag. 170, with a cut of a Yucatecan axe:

From Landa.



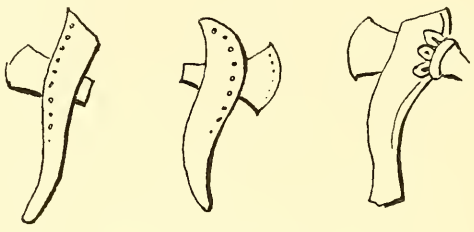
"They had little axes made of a certain metal, and shaped as the illustration shows. They fastened them into the top of a wooden handle, one side serving as a weapon, the other for cutting wood. They sharpened them by hammering the edge with stones." *Torquemada, Mon. Ind., Lib.* 13, *Cap.* 34: "The carpenters and carvers worked with copper instruments." *Herrera, Dec. IV., Lib.* 8, *cap.* 3: "In Honduras (1530) they cleared large mountains, for agricultural purposes, with axes made of flintstone."

Remesal, Hist. d. l. Prov. de Chiapas y Guatemala, 1606: "They clear, every year, large mountains of woods, in order to prepare them for the reception of the seed corn, as is the custom in the whole province of Vera-paz; and before they got the iron axes they had to work hard because they felled the trees with copper axes and often spent an entire day in cutting one single tree, though of inferior size; and if the tree was larger three and four days, those axes being very apt to break; and having experienced the strength of iron, they appreciate all tools made of it, and thus they held our axes and machetes in great esteem." *Cogolludo, Hist. d. Yucatan, Lib. IV., Cap.* 3, mentions axes as an article of trade in Yucatan: "Copper axes, brought from Mexico, which they exchanged for other merchandize." *Documentos ineditos, Madrid*, 1864, *Vol. I., pag.* 470: "The Captain, Gil Gonzales de Avila, arrived here in Sto. Domingo (from Nicaragua) and sends to His Majesty 14,000 pesos de oro and 15,000 pesos, proceeding from axes which they said contained gold, and 6150 pesos de oro proceeding from bells which they also said contained gold. All this he said he was presented with during his discoveries which he was making in the Province of the South sea." *Petrus Martyr, Dec. VI., Chapt.* 2 *and* 3, states the same fact on the authority of Gil Gonzales' treasurer, Cereceda.

* The absolute absence of mines in Yucatan is a fact that needs no further corroboration. It might, however, be of interest to hear the language used by Landa, Rel. d. las cosas de Yucatan: l. c. § 5 "There exist many beautiful structures of masonry in Yucatan, all of them built

blades and that of the handle and the adjustment of both, at least as far as is shown (see cut 8) by the pictures of the Dresden Codex, which are of genuine Yucatecan origin,

Cut 8.



Axes of Yucatan.

appear to have been identical with those of the interior of Anahuac.

Among the copper and bronze axes noted below, those of Nicaragua appear to have been of an uncommonly rich alloy of gold. The reader will smile at Herrera's account of the shrewdness shown by the native ladies in keeping for themselves the plates of pure gold they were attired with, and burdening the soldiers of Gonzales with heavy metal axes.* The axes mentioned by Gomara, undoubtedly came

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of stone and showing the finest workmanship, the most astonishing that ever were discovered in the Indies; and we cannot wonder at it enough because there is not any class of metal in this country by which such works could be accomplished."

* *Herrera (Dec. III., Lib. 4, Cap. 5)* having the original reports before his eyes, represents this scene as follows: "Multitudes of Indians flocked along the ways, astonished to see the beards and the dressing of the Spaniards. The chief person they met was Dirianjen, the warlike cacique, who came attended by five hundred men and seventeen women, covered with gold plates, all drawn up in order, but without arms and with ten banners and trumpets, after their fashion. When they came near, the banners were displayed and the cacique touched Gonzales' hand, as did all the five hundred, everyone giving him a turkey. Yet each of the women gave him twenty axes of gold (veinte hachas de oro) fourteen carats fine, each weighing eighteen pesos and some more." We find in *Oviedo (Gonzalo Fernandez de), Historia gen. y nat. de las In-*

from the mines of Anahuac, since their alloy was not only gold, but tin and silver. Gomara is the first who notes the chisel and the borer.

Let us further ascertain, what Father Sahagun* is able to tell us about Mexican metal tools. As a teacher of the young native generation, he made it his life's task to teach his pupils all that concerned the religious belief, the history and the industry of their forefathers. We extract from Lib. 10, cap. 7, the following passages and translate them as literally as possible: "The goldsmith is an expert in the selection of good metal. He knows how to make of it whatever he likes and does it with skill and elegance. He is conversant with all kinds of devices, and all this he does with composure and accuracy. (*Con medida y compas*). He knows how to purify the ore, and makes plates of silver as well as of gold

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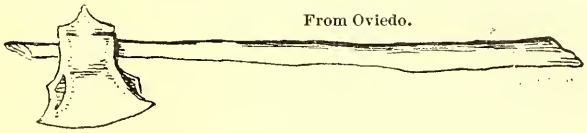
dias, at the end of Vol. IV., five folio quarto pages with illustrations referring to the chapter he wrote on Nicaragua, and we learn from his text that he made the sketches himself during his sojourn in Nicaragua (1524). They represent views of the volcano of Masaya, gymnastic sports of the Indians, a plan of the town of Tecoatega, and three Indian arms, an *estorica*, a *porra* and an *alabarda*. Each of the drawings is provided with a number which correctly corresponds to that written in the text, except those three drawings of the arms, for which we could not find the text. Upon closer examination we discovered a suggestion made (on page 81) that some ancient copyist or editor must have revised Oviedo's original manuscript, who was supposed to have dropped the inscription to which the drawings of the three arms belong, perhaps, only on account of the illegibility of Oviedo's handwriting. On the other hand, we cannot help expressing our doubts as to the fact that these three kinds of arms should have been in use with the Nicoyans or Nicaraguans. Notwithstanding we give the cut of the alabarda, which has the shape of a genuine mediæval battle-axe.



From Oviedo.

* Sahagun (Bernardino de), Historia de la N. España, Ed. Carlos M. de Bustamante, 3 Vol., Mexico, 1830.

from the cast metal. He knows likewise how to make moulds of carbon (*moldes de carbon*), and how to put the metal into the fire in order to smelt it. The unskilful goldsmith does not know how to purify the silver, he leaves it mixed up with the ashes, and has his sly ways in taking and stealing something of the silver." Further on in Cap. 24: "he who is a trader in needles (*agujas*), casts, cleans, and, polishes them well; he makes also bells (*cascabeles*), filters (*aguijillos*), punches (*punzones*), nails (*clavos*), axes (*hachas*), hatchets (*destrales*), cooper's adzes (*azuelas*), and chisels (*escoplos*)."

In these two passages is summed up all that we sought to gather piecewise from the writers of the Conquest, on our special question. A few new features, however, are cropping out in this enumeration of implements, which give rise to the suspicion, that the goldsmith is described, not as he worked before the year 1521, but as he had perfected himself and enlarged his technical knowledge through the intervention of Spanish mechanics, in the year of Sahagun's writing, about 1550. We mean the moulds of carbon, the nails,* and the cooper's adze, of which we read in Sahagun exclusively, and of which no pictures or other evidences of their ante-Spanish existence have been preserved.

Pictures of needles frequently occur in the Mexican paintings. But it is understood that they are without an eye, the introduction of our sewing needle having been an

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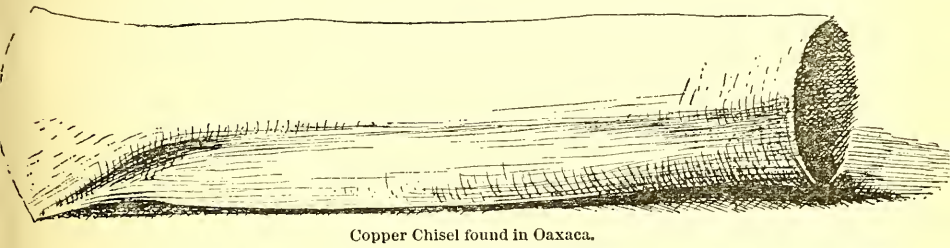
* The following notice of three prehistoric nails is given for what it is worth. Torquemada, Lib. VI., Cap. 23: Under the reign of Nezahualpilli of Tezcuco, the statue of the God of Rain, Tlaloc, having been found to be timeworn and corroded, a new one was made and located on the mountain of Matlalcueye, the ancient site of this statue. "When this idol of Tlaloc was replaced by the new one, it happened that one of its arms broke off. They put it on again and fastened it with three gold nails. Later, when the new faith was introduced in their countries, this diabolical image was brought down from the hills, at the time of the first Bishop Zummaraga, and was broken to pieces in his presence, but not before removing the three gold nails spoken of."

actual revelation to the natives. The head of a Mexican needle, or rather pin, was full, and split like that of an animal's bone. The borer, certainly, had no handle or spiral point. Of all these stitching, piercing and drilling instruments nothing has been preserved, in kind.

A chisel of copper was, however, discovered by Captain Dupaix* near the city of Antequera (in Oaxaca). We give a faithful fac-simile of it in cut 9. It is described by the dis-

Cut 9.



Copper Chisel found in Oaxaca.

coverer in the following words: "There are also many chisels of red copper found in the neighborhood of this city, a specimen of which I possess, and will show in the illustrations. Its length is seven inches, and the thickness is one square inch (sic), and one side is edged, and this edge is a little dull, showing that it had been in use. We do not know the temper they gave to these instruments in order to employ them in their labors and in their arts, or to give the wood or possibly the stone a regular form."

We do not know if this chisel is still preserved in the Museum of Mexico, to which it was presented by Captain Dupaix. If not, we hope to be somewhat indemnified by another specimen of bronze chisel, of which we are now in pursuit, and which according to description is similar in form and composition to the one spoken of. Señor Andrez Aznar Perez, now in New York, ploughed up such a tool

* Dupaix, Antiquités Mexicaines, Paris, 1834, Vol. II., Planche 26, fig. 75, and text in Vol. I., page 21, No. 75.

about twelve years ago, on his plantation near the river Tzompan in Tabasco, at the depth of nearly 12 inches. It was entirely solid, and had a slightly rounded edge, about an inch in length, and he offers to have it brought from Yucatan for farther examination.

From the illustration of Captain Dupaix and the description of Mr. Perez, we can for the moment only conclude that the ancient Mexican chisel was similar in its form to that which our stone-masons now make use of.

In regard to the form of ancient Mexican axes, we gave a general idea at the beginning of this essay, but we have still several details to discuss. In the illustrations the curved wooden handle will no doubt appear remarkable. The Mexican painters were such faithful imitators of what they saw, that we cannot presume they would have indulged in what was an essential alteration of the object to be copied. If the handle of the axe was curved, they would have copied it curved, and thus it appears not only in the Mexican but also in the Yucatecan picture codices.

Those acquainted with the practical handling of axes, and with felling trees, know that a curved handle must increase the swinging power of an axe to a considerable degree, and to have used this form is a remarkable instance of Mexican technical craft and cunning. It would be worth while to investigate whether this use of a curved handle was exclusively confined to the natives of Central America, or had passed beyond its boundaries, north as well as south.

We farther learn from the pictures, that not the blade of the axe, but the handle had an opening at a certain distance from the top, into which the blade was fitted.

The specimens represented in the cuts 1, 3, 5, 6, 8, appear to be common chopping axes. In the coat of arms of the town of Tepozcolula (see cut 4), however, as already pointed out, the form of the axe differs from those of Tepoztla and Tepoztitlan. In order to obtain a correct idea of these particular kinds of axes, we invite the reader to

compare it with another picture (Cod. Mendoza, page 71, fig. 77), and which we give in cut 10. The shape of the axes themselves are evidently alike, in the one as well as in the other picture, only that in cut 10 the axe is not in connection with the coat of arms, but is held by a man who is at work dropping or squaring the branch of a tree, from which chips are flying off. This kind of axe, evidently, served a different purpose from those chopping axes of Tepoztla. It was the hatchet used by the carpenter. Thus reads the explanation given in Kingsb. Coll., Vol. V., page 112.

Cut 10.

Mexican carpenter.

This instrument is of the most extravagant form. Were it not for the authentic interpretation of the picture and the accessories we should not be able to make out what kind of object it represented, and least of all that it was a hatchet.

Let us examine its construction. The wooden handle has the shape of all the Mexican and Yucatecan axes,—that of a somewhat curved club. But instead of its being chopped off at the top, the handle extends farther and is bent down to an angle of about 45 degrees. On the head of this bent top a deep notch is visible, into which the blade of a little axe is fixed, being fastened by a tongue or string wound three times around. Thus, when a blow was struck, we can presume, the head of the tenon would not move, from the resistance it met from the bottom of the notch. Thus much the picture proves, and we cannot learn anything more of this instrument. We only presume that in order to get a durable handle, they sought a curved branch, and that this branch came generally from one particular class of trees. The word *Tepozcolula* signifies, properly, the town in which copper was bent, *tepuzque* (copper), and *coloa* (to bend), but we learn from our picture, that the

natives understood these words to signify the town where the curved handles were manufactured, which seems to be corroborated by another picture which we found for the coat of arms of the town of Tepozcolula, Cod. Mendoza, pl. 45, fig. 5, in which the painter (see cut 11) has laid a special stress upon this curving of the *handle*, by shaping the end of the handle into an exaggerated spiral form.

Cut 11.

Tepozcolula.

There existed also a town, in which carpenter's work was the chief occupation of the inhabitants. This is to be inferred from the coat of arms belonging to the town of Tlaximaloyan, cut 12, Cod. Mendoza, pl. 10, fig. 5.

Tlaxima signifies to work as a carpenter, and *tlaximalli* a chip of wood. The "*little*" axe of copper, found by Dupaix at Quilapa, and of which he gives an illustration not differing from the known shapes of all axes, is very probably a specimen of this carpenter's axe (see Dupaix, Vol. II., 3d Expedition, Planche II., fig. 4).

Cut 12.

fig. 5.

Town of Tlaximaloyan.

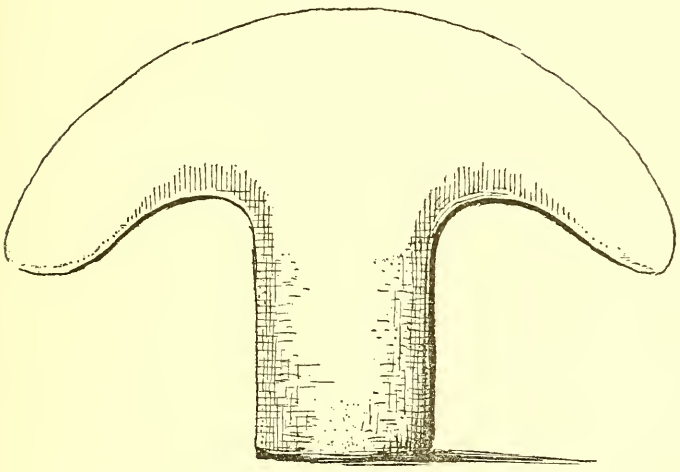
It is but natural to think that being in possession of the large chopping axe, the invention of the small hatchet would have become incomparably easier than that of this awkward carpenter's tool. We are, however, too little informed to judge or to criticize its construction and rather incline to think that these people had reasons of their own for giving it the form it has. It must have been the one which Sahagun called "destral," or carpenter's hatchet.*

We can still offer another form of copper tool once used

* With our first glance at the picture of *Tepozcolula* we were induced to believe that we had found therein a representation of the instrument which Petrus Martyr called a "*dolabra*," and Sahagun "*azuela*." The

by the natives. Dupaix* discovered the original near the same town where he had found the chisel. Below is a copy of his drawing in cut 13 :

Cut 13.



Copper Tool, found by Dupaix in Oaxaca.

The edge of this tool will be noticed to have a curve belonging to the circumference of a circle. The cutting blade is 10 inches wide. Like the axes, it has a tenon by which it could be fastened to an opening in a wooden handle. It will appear from closer description that it was too thin to have been used for heavy operations. Let us consult the narration of the explorer : " This instrument is of red and very pure copper, and when touched it gives out a sonorous sound. The metal is *not hammered* but *cast.* It is of not much weight, symmetrical, and of graceful shape. The contours

translation of the one is, pick or hoe, and of the other, cooper's adze. Both of these, therefore, would have been instruments in which the blade and its edge are at right angles to their handle, and the management of which requires both hands of the workman. This supposition is refuted by the picture of the carpenter (cut 10), who is distinctly seen to hold the piece of wood in the left and the tool in his right hand.

* Dupaix, l. c., Vol. II., Planche 26, fig. 74, and text Vol. I., page 21.

are regular and resemble those of an anchor. It is flat on both sides, the portion serving as a handle (or tenon) is a little thicker and slopes towards the edge, which cuts as well as a chisel. An Indian, named Pascual Baltolano, from the village of Zocho Xocotlan, half a mile distant from this city of Antequera, a few months ago, when tilling his field met with an earthen pot which contained 23 dozen of these blades, their quality, thickness and size being a little different from each other. This gives rise to the supposition that there existed various moulds, by means of which these specimens were multiplied and cast. They did not differ greatly from that which I possess. We meet here with a great difficulty, which is to determine to what usage these instruments were destined,—to agriculture or mechanics, as instruments of sacrifice or a variety of offensive weapon that was fixed in the point of a lance? That which is certain, however, is that they are found in abundance in this province and that merchants buy these metals from the Indians and rank them high on account of the superior quality of the ore." On proceeding in his expedition, the same author reaches the village of Mitla, where in the parochial church he receives the following disclosure on the purpose of the before-mentioned tools: "One day, when hearing mass in Mitla, I noticed an ancient picture, which represented (San.) Isidro, the patron of the laborers, and saw him painted holding in his right hand a pole armed with the problematic blade. I therefrom conclude, that like the ancient Indians, the native laborers of to-day have adopted this instrument as a distinctive mark of their profession, and that instead of being an instrument of death it must be viewed as one for giving life." This explanation agrees satisfactorily with what could be inferred from its size and its peculiar shape, and if we imagine the tenon bent and in this form fastened to the top of a pole we should possibly have discovered a certain garden instrument of which the Spaniards spoke as always used by the natives, the *uictli*, or coa, hoe. It was never described in

particular, nor could we discover it in the pictures, but Molina's translation of *uictli* with "*coa*" which is hoe, tells the story.

There is still something more in this passage of Dupaix, that is worth considering. Among the 23 dozen of the instruments contained in the earthen pot, and of which he was informed that they were similar in shape to that which he had found, it is clear that there must have been a great number of very diminutive size; otherwise we cannot conceive how so many of them would have been placed in the pot, at all. Let us take advantage of this suggestion and suppose Dupaix's engraving, cut 13, reduced to a diminutive size. We make thereby a little figure, and we cannot deny that it looks like a Greek *Tau*. Of such a *Greek Tau*, formed from copper, and used by the natives as money at the time of the Conquest mention is made by the chroniclers.* They may be right, but with the understanding that these copper pieces were not manufactured for the purpose of serving as coin, but as tools, which of course, came into market and became objects of barter, as we read the copper bells also did, besides grains of the cacao fruit, bales of cotton, axes and other articles of common necessity.

Thus much, and no more, we were able to glean from the early literature of the Conquest and from the paintings of the natives. As we anticipated at the outset, the testimony bearing on copper industry among the early Mexicans is altogether incomplete and lacks that fulness of description in which those writers indulge when treating topics of social

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* Torquemada, Mon. Ind., Lib. —, Chap. —: "They also used certain copper coins, almost in the shape of a Greek Tau, T, its width about three or four fingers. It was a thin piece of plate of an uncertain size, and contained much gold." Clavigero, The History of Mexico, Ed. Ch. Cullen, London, 1807, Vol. VII., Sect. 36, page 386, evidently copies the sentence when he says: "Their fourth species of money, which most resembled coined money, was made of pieces of copper, in the form of a T, and was employed in purchases of little value."

customs, religious rites, or monstrous idols. In but few instances the pictures gathered from the codices illustrate the dim suggestions and the doubtful wording of the Spanish text, so as to give at least a general idea of the localities where the copper ores were obtained, of the process of smelting, of the moulds that were used, and the objects or tools that were produced by these means.

One point however we think we have come very near deciding, and one which when collecting our notes was constantly in mind, namely: Whether the Mexican bronze was to be viewed as an artificial or a natural product? There was a great doubt concerning this question caused by the first notices respecting the composition of the bronze. The expressions of Cortes and Bernal Diaz were of so condensed a character that we were at a loss how to reduce them to their elementary meaning, and the doubt was not removed when examining apart each of the subsequent writers on the same subject. But when putting their statements together, a certain basis, at least, could be obtained, from which to deduce a settled opinion. From the combined statements we learned that the bronze found among the natives contained a rich basis of copper, which was mixed either with gold, or with silver, or with tin, and we might infer from this variety of admixtures, that the natives manufactured their *laton* according to a fixed method. But, on the contrary, as the three metals named are always found to be the steady components of Mexican copper ore, we are led to the presumption, that these ores were worked in their unaltered condition, just as nature had produced them. It is not indeed meant to teach thereby, that the native did not appreciate the fact, that copper of a deep red was softer than that of a lighter color. Whenever they had to manufacture a chisel and had a choice between the two qualities, we are certain they would have employed the lighter metal for this purpose. But we hardly believe that they considered the light metal

to be a composition of the red colored copper with either silver, gold or tin. This belief would involve a presupposition of metallurgical science in the early Mexicans, that we have not the least knowledge they had ever attained to. On the other hand, however, there is a strong reason for the belief, that they recognized this light metal to be related to the red copper. For if they had thought this bronze or *laton* to be a separate kind of metal, they would have had a separate name for it, as they had for all the other metals, from the gold down to the tin, and even to the cinnabar. Bronze would have been called *tepuzque* as was copper, but probably—with the addition descriptive either of color or of hardness.

We were unable to discover one single hint, from which to infer that they possessed the knowledge of hardening copper by dipping the hot metal into water. This is a hypothesis, often noted and spoken of, but which ranges under the efforts made for explaining what we have no positive means to verify or to ascertain.

Though we have gained so little from our researches, this little, however, we hope may incite others to extend their investigations, and thus render the path clearer which we have tried to explore into this field of prehistoric industry. The most substantial proofs and contributions may be expected from our fellow-students in Mexico. They dwell upon the ground which was the scene of this ancient industry. They are also in a continuous contact with a numerous indigenous race, which despite of European attempts to improve their working facilities, still tenaciously cling to their old usages and fashions. Our Museums are overcrowded with Mexican idols, pottery, and flint arrow-heads. One specimen of an ancient tin-borer, one of a copper axe or hoe, or of a bronze chisel would be counted as a very welcome and valuable acquisition.

THE KATUNES OF MAYA HISTORY.

THE KATUNES OF MAYA HISTORY.

By Philipp J. J. Valentini, Ph.D.

[*Translated from the German, by Stephen Salisbury, Jr.*]

[From Proceedings of American Antiquarian Society, October 21, 1879.]

NOTE BY THE COMMITTEE OF PUBLICATION.

The Publishing Committee are glad of the opportunity to print another paper from the pen of Professor Valentini. His previous contributions have been favorably received by some of the most competent judges. He is always ingenious and suggestive, taking care to sustain his views by adequate collateral information, and leaving an impression of earnestness and thoroughness, even though the reader should not be able always to see the way through his bold inferences to the important conclusions deduced from them.

It seems apparent that new phases of opinion respecting the position in the world's history held by the races occupying the central portions of the American Continent may be looked for in the near future. Or rather, perhaps, it may be claimed that vestiges of ancient and independent culture, of revolutions, conquests, and changing dynasties, extending back to a remote period of time, which have hitherto simply excited and bewildered travellers and explorers, bid fair to be subjected to tests and comparisons derived from wider and closer observation, for which the means are accumulating, and from which definite results are anticipated.

It is remarkable how one tidal wave of investigation after another has, at different eras, invaded and receded from these regions, carrying from them more or less of the fragments of their architectural, monumental, and pictorial records — the sources of doubtful and unsatisfactory interpretation. The Spanish chroniclers; the scientists of the period of Humboldt and his contemporaries; the French government and the learned societies of France, uniting their efforts to render effective the honest but undisciplined enthusiasm of Brasseur de Bourbourg; all have experienced a subsidence of interest arising mainly from a want of success in yielding a sufficiently plausible solution of a mysterious subject. The death of Brasseur, the fall of Maximilian, and the political distractions of the French government and people, are not alone the causes of suspended action on the part of the learned bodies of France. They deemed it prudent to discredit the judgment and correctness of their own agent. One at least of Brasseur's Commission publicly disavowed responsibility for his opinions; and his attempt to interpret

the Codex Troano by means of the alphabet of Bishop Landa was pronounced by themselves to be a failure.

How signally the explorations of Del Rio, of Dupaix, of Galindo, and of De Waldeck, failed to make a permanent impression on the public mind! How soon the illustrated narrative of Stephens became in a measure disregarded, and even his reliableness questioned! How completely the nine ponderous folios of Lord Kingsborough's extensive collection fell dead from the press, until the great work to which he had devoted his life and his entire fortune sold in the market for less than a single useless production of Increase or Cotton Mather! We have seen the elaborate and learned essays of Gallatin upon Mexican civilization slumbering with the long sleep of the Ethnological Society; the Geographical Society cautious about travelling out of the routes of regular expeditions; even the sardonic "Nation," assumed arbiter in literature, politics, and science, and always ready for caustic criticism, hesitating to venture far beneath the surface of these important inquiries. The ill-fated Berendt has perished in the midst of his unfinished labors; and, lastly, one of the most purely philosophical investigators of Indian habits and history reasons in a direction opposed to the antiquity and extent of aboriginal civilization.

If there is to be a renewal of interest in Mexican archæology, and a revived consciousness of something more to be gained from the relics of culture among the early races of this continent (a meaning in its mystical remains that has not been developed), our Society may claim its share in the re-kindling or fostering of the newly excited impulse. In saying this we do not overlook the preparation which recent studies of the general condition of prehistoric races has created for such investigations; but, in this particular field, it has had the fortune to draw special attention to certain regions and opportunities of research. This has been due to the earnest and liberal exertions of one of its members, who, some years since, passed a winter in Yucatan, and has kept up a correspondence with friends and acquaintances there.* He embodied his observations and experiences in a report on behalf of the Council rendered in 1876. He has since endeavored to promote the operations of Dr. and Mrs. Le Plongeon in the actual field, and has assisted in preparing the papers of Professor Valentini for our publications, providing illustrations in all cases when practicable. The Report of the Council in the present number of "Proceedings" is largely devoted to an account, by the writer† of a visit to the city of Mexico, and his observations upon the country and its history. More than twelve years ago, in January, 1868, a generous member of the Society‡ had the forethought to establish a department of the library composed of books relating to Spanish America, beginning with the gift of Lord Kingsborough's mammoth publication, and others, for the

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*S. Salisbury, Jr., Esq. † Col. John D. Washburn. ‡The Hon. Isaac Davis.

specialty of antiquities, and accompanied by a pecuniary foundation for future growth. The importance of a provision for this particular purpose becomes daily more conspicuous as attention is directed to that portion of the continent.

It is gratifying to perceive that such movements, with the greater activity in publishing its "Anales" on the part of the Museo Naçional de México, and the issue of such publications as that of Prof. Rau by the Smithsonian Institution,* and the private work of Mr. Short,† are not without their influence.

The scheme, which, although not fully matured, we have reason to believe a real one, of sending an expedition to some of the original Mexican provinces for a thorough exploration, at the cost of a wealthy citizen of New York, the results to be printed in the North American Review, may be regarded as one of the fruits of the "*Renaissance.*"

S. F. Haven,
For the Committee.

Introductory Remarks.

In the ensuing discussion an attempt is made to explain the so-called "Katunes of Maya history."

The Manuscript which bears this name is written in the Maya language, and its discovery is of comparatively recent date. At its first publication in 1841 it could not fail to attract the attention of all those who were engaged in the study of ancient American history, because it unveiled a portion of the history of Yucatan, which had been till then entirely unknown and seriously missed. At that date only a scanty number of data, loosely described, and referring to an epoch removed from the Spanish conquest of the Peninsula by only a few decades, had appeared as the sole representatives of a long past, in which the builders of the ruined cities undoubtedly must have lived an eventful life, not to be counted by a few generations, but by a long and hardly calculable number of centuries. This vacuum of time the manuscript promised to fill out. Though it did not offer a history conceived in the common acceptation of the

* The Palenque Tablet, in the U. S. National Museum. By Charles Rau, 1879.

† The North Americans of Antiquity, their origin, migrations, and type of civilization considered. By John T. Short. 1880.

word, the brief epitome of events which it presented, began by telling us of the arrival of foreigners from distant lands, who, step by step succeeded in conquering the Maya soil and who were brought into significant connection with the name as well as the fall of cities now lying in ruins over the whole country.

As to the authenticity of the events reported, they have been received by many students with a confidence and faith rarely manifested when discoveries of such importance are brought to light. As to the form in which they were presented, the author seemed to exhibit neither the skill of a professional nor the clumsiness of an occasional forger. If on the one hand the gaps he left betrayed a defective memory, this circumstance should be held rather as an indication of his credibility. The material from which his information was derived, we might add, was extensive, and much of it was probably lost when he gave the account at a later period of his life.

The events communicated being in themselves of the highest interest, rose in importance from the fact that they were arranged in successive epochs. A chance was thereby given to calculate the long space of time that intervened between the arrival of the ancient and of the modern conquerors. This difficult task was attempted by the fortunate discoverer himself, Señor Juan Pio Perez, of Yucatan, accompanied by a learned discussion on ancient Maya chronology. His calculation furnishes the sum of 1392 years, the first initial date to be assigned to the year 144 A. D., and the last to 1536 A. D.

When, some years ago we undertook to examine the argument of Señor Perez we were not at all astonished by the great antiquity of the date he had drawn from the Maya Manuscript. For, nearly at the same time, we had reached similar results in an attempt made to utilize certain records which Ixtlilxochitl (1590), and Veytia (1760), (Kingsborough Collection, Vols. 8 and 9), have left regarding the earliest chronology of the Nahuatl tribes. By adopting a more

rational method of computation than those Mexican writers had followed, we were unable to withstand the conclusion, that the Nahuatl people who were immediate territorial neighbors of the Mayas, considered the year 258 A. D. the earliest date of their arrival on and occupancy of the Mexican soil. Thus we had reached in this line of investigation very nearly the same results with the Nahuatl as Señor Perez with the Maya chronology, and the suspicion began to dawn upon us that these two neighboring people might, possibly, have stood in a still closer than a mere territorial connection.

These results, however, were only of a very problematical nature. They were derived from written reports, which, after all, could not be regarded as unquestionable authority. But they received a strong confirmation from a discovery we made later on the so-called Mexican Calendar Stone. In our discussion of this monument we believe that we have given ample proof of the fact, that its principal zone contains a sculptured record, showing a series of numerical symbols, from the computation of which the year 231 A. D. resulted as that which the Nahuatls had accepted as the first date of their national era.

Records presented in stone and compiled by the nation whose history they convey, must always be considered the most authentic evidence of historical truth. Now, were we also so fortunate as to possess some Maya monument, similar to the Mexican Calendar Stone, and were we also able to decipher it, we should thereby have the means for determining whether Maya chronology extended back to an epoch different from that of the Nahuatl, or to one identical with it. That such a monument once existed we have no doubt. That it may still exist, we have no reasonable grounds for denying the possibility. It remains, however, still to be discovered and to be interpreted. But since the fortunate discovery has not yet been made, we must rest satisfied for the present with conclusions derived from extant written records. The only manuscript of this character thus far

brought to light, is that said to have been found at Mani,* which was translated by Señor Perez from the Maya language, and accompanied by a very valuable chronological interpretation.

Since the close revision we undertook of the latter, brought out very striking coincidences of early Maya dates with those of the Nahuatl, and especially with that indicated on the Calendar Stone, we thought it worth while to reprint the manuscript, to discuss its contents again, and to arrange them under new points of view. Regarded by itself, the manuscript, indeed, might seem of only doubtful value in settling an important chronological question. But the comparison of its earliest date with that of the Nahuatl monument will enhance the value of each of them, because they may be considered as corroborative of each other.

The Maya Manuscript.

Maya.	*Translation.*
Lai u tzolan Katun lukci ti cab ti yotoch Nonoual cante anilo Tutul Xiu ti chikin Zuiua; u luumil u talelob Tulapan chiconahthan.	This is the series of "Katunes" that elapsed from the time of their departure from the land and house of Nonoual, in which were the four Tutul Xiu, lying to the west of Zuina, going out of the country of Tulapan.
§ 1. Cante bin ti Katun lic u ximbalob ca uliob uaye yetel Holon Chantepeuh yetel u cuchulob: ca hokiob ti petene uaxac Ahau bin yan cuchi, uac Ahau, can Ahau cabil Ahau, cankal haab catac huuppel haab; tumen hun piztun oxlahun Ahau cuchie ca uliob uay ti petene cankal haab catac huuppel haab tu pakteil yetel cu ximbalob lukci tu luumilob ca talob uay ti petene Chacnouitan lae, u añoil lae 81.	§ 1. Four epochs were spent in travelling, before they arrived here with Holonchantepeuh and his followers. When they began their journey toward this island, it was the 8th Ahau, and the 6th, 4th and 2d were spent in travelling; because in the year of the 13th Ahau they arrived at this island, making together eighty-one years they were travelling, between their departure from their country and their arrival at this island of Chacnouitan.
	Years 81.

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* Historia de Yucatan. By Eligio Ancona, Mérida, 1879, Vol. I., page 95, note 1.

§ 2. Vaxac Ahau, uac Ahau, cabil Ajau kuchci Chacnouitan Ahmekat Tutul Xiu hunppel haab minan ti hokal haab cuchi yanob Chacnouitan lae: lai u habil lae. 99 años.

§ 3. Laitun uchci u chicpahal tzucubte Ziyan-caan lae Bakhalal, can Ahau, cabil Ahau, oxlahun Ahau oxkal haab cu tepalob Ziyaucaan ca emob uay lae: lai u haabil cu tepalob Bakhalal chuulte laitun chicpahci Chichen Itza lae. 60 años.

§ 4. Buluc Ahau, bolon Ahau, uuc Ahau, ho Ahau, ox Ahau, hun Ahau uac kal haab cu tepalob Chichen Itza ca paxi Chichen Itza, ca binob cahtal Champutun ti yanhi u yotochob ah Ytzoab kuyen uincob lae. 120 años.

§ 5. Vac Ahau, chucuc u luumil Chanputun, can Ahau, cabil Ahau, oxlahun Ahau, buluc Ahau, bolon Ahau, uuc Ahau, ho Ahau, ox Ahau, hun Ahau, lahca Ahau, lahun Ajau, uaxac Ahau, paxci Chanputun, oxlahun kaal haab cu tepalob Chanputun tumenel Ytza uiucob ca talob u tzaclé u yotochob tu caten, laix tun u katunil binciob ah Ytzaob yalan che yalan abau yalan ak ti numyaob lae; lai u habil cuchinbal lae. 260.

§ 6. Vac Ahau, can Ahau, ca kal haabcatalob u heoob yotoch tu cateh ca tu zatahob Chakanputun: lay u habil lae. 40

§ 7. Lai u katunil cabil Ahau, u heoci cab Ahcuitok Tutul Xiu Vxmal. Cabil Ahau, oxlahun Ahau, buluc Ahau, bolon Ahau, uuc Ahau, ho Ahau, ox Ahau, hun Ahau, lahca Ahau, lahun Ahau, lahun kal haab cu tepalob yetel u halach uinicil Chichen Itza yetel Mayalpan: lay u habil lae. 200

§ 2. The 8th Ahau, the 6th Ahau; in the 2d Ahau arrived Ajmekat Tutul Xiu, and ninety-nine years they remained in Chacnouitan. Years 99.

§ 3. In this time also took place the discovery of the province of Ziyan-caan or Bacalar, the 4th Ahau and 2d Ahau, or sixty years, they had ruled in Ziyan-caan when they came here. During these years of their government of the province of Bacalar occurred the discovery of Chichen-Itza. Years 60.

§ 4. The 11th Ahau, the 9th, 7th, 5th, 3d and 1st Ahau, or 120 years, they ruled in Chichen-Itza, when it was destroyed, and they emigrated to Champoton, where the Itzaes, holy men, had houses. Years 120.

§ 5. The 6th Ahau they took possession of the territory of Champoton; the 4th Ahau, 2d, 13th, 11th, 9th, 7th, 5th, 3d, 1st, 12th, 10th and 8th, Champoton was destroyed or abandoned. Two hundred and sixty years the Itzaes reigned in Champoton, when they returned in search of their homes, and they lived for several katunes under the uninhabited mountains. Years 260.

§ 6. The 6th Ahau, 4th Ahau, after 40 years, they returned to their homes once more and Champoton was lost to them. Years 40.

§ 7. In this Katun of the 2d Ahau, Ajcuitok Tutul Xiu established himself in Uxmal; the 2d Ahau, the 13th, 11th, 9th, 7th, 5th, 3d, 1st, the 12th and 10th Ahau, equal to 200 years, they governed in Uxmal, with the governors of Chichen-Itza and of Mayapan. Years 200.

§ 8. Lai u katunil buluc Ahau, bolon Ahau, uac Ahau, uaxac Ahau, paxci u halach uinicil Chichen Itza tumenel u kebanthan Hunac-eel, ca uch ti Chacxib chac Chichen Itza tu kebanthan Hunac-eel u halach uinicil Mayalpan ichpac. Caukal haab catac lahun piz haab, tu lahun tun uaxac Ahau cuchie; lai u haabil paxci tumenel Ahzinteyutchan yetel Tzunte-cum, yetel Taxcal, yetel Pantemit, Xuchu-cuet, yetel Ytzcuat, yetel Kakaltecat lay u kaba uinicilob: lae muctulob ahmayal panob lae. 90.

§ 9. Laili u katunil uaxac Ahau, lai ca binob u pâ ah Vlmil Ahau tumenel u uahal-uahob yetel ah Ytzmal Vlil Ahau; lae oxlahun uuo u katunilob ca paxob tumen Hunac-eel: tumenel u oabal u naatob; uac Ahau ca ooci: hunkal haab catac can lahun pizi: lai u habil cu xinbal. 34.

§ 10. Vac Ahau, can Ahau, cabil Ahau, oxlahun Ahau, buluc Ahau, chucuc u luumil ich pâ Mayalpan, tumenel u pach tulum, tumenel multepal ich cah Mayalpan, tumenel Ytza uinicob yetel ah Vlmil Ahau lae; can kaal haab catac oxppel haab: yocol buluc Ahau cuchie paxci Mayalpan tumenel ahuitzil oul, tan cah Mayalpan. 83.

§ 11. Vaxac Ahau lay paxci Mayalpan lai u katunil uac Ahau, can Ahau, cabil Ahau, lai haab cu ximbal ca yax mani españoles u yaxilci caa luumi Yucatan tzucubte lae, oxkal haab pâaxac ich pâ cuchie. 60.

§ 8. These are the Katunes 11th, 9th and 6th Ahau (sic). In the 8th Ahau the governor of Chichen-Itza was deposed, because he murmured disrespectfully against Hunac-eel. This happened to Chacxibchac of Chichen-Itza, governor of the fortress of Mayapan. Ninety years had elapsed, but the 10th year of the 8th Ahau was the year in which he was overthrown by Ajzinte-yutchan, with Tzuntecum, Taxcal, Pantemit, Xuch-uenet, Ytzcuat and Kakaltecat; these are the names of the seven Mayalpanes. Years 90.

§ 9. In the same Katun of the 8th Ahau they attacked Chief Ulmil, in consequence of his quarrel with Ulil, Chief of Yzamal; thirteen divisions of troops he had when he was routed by Hunac-eel; in the 6th Ahau the war was over, after 34 years. Years 34.

§ 10. In the 6th Ahau, 4th, 2d, 13th and 11th Ahau, the fortified territory of Mayapan was invaded by the men of Itza, under their Chief Ulmil, because they had walls, and governed in common the people of Mayalpan; eighty-three years elapsed after this event, and at the beginning of the 11th Ahau Mayalpan was destroyed by strangers of the Uitzes, Highlanders, as was also Tancaj of Mayalpan. Years 83.

§ 11. In the 8th Ahau, Mayalpan was destroyed; the epochs of the 6th, 4th and 2d Ahau elapsed, and at this period the Spaniards for the first time arrived, and gave the name of Yucatan to this province, sixty years after the destruction of the fortress. Years 60.

§ 12. Oxlahun Ahau, buluc Ahau, uchci mayacimil ich pâ yetel noh-kakil: oxlahun Ahau cimci Ahpula: uacppel haab u binel ma ɔococ u xocol oxlahun Ahau cuchie, ti yanil u xocol haab ti lakin cuchie, canil kan cumlahi pop, tu holhun Zip catac oxppeli, bolon Ymix u kinil lai cimi Ahpula; laitun año cu ximbal cuchi lae ca oheltabac lay u xoc numeroil años lae 1536 años cuchie, oxkal haab paaxac ich pâ cuchi lae.

§ 13. Laili ma ɔococ u xocol buluc Ahau lae lai ulci españoles kul uincob ti lakin u talob ca uliob uay tac luumil lae; bolon Ahau hoppci cristianoil uchci caputzihil: laili ichil u katunil lae ulci yax obispo Toroba u kaba, heix año cu ximbal uchie. 1544.

§ 12. The 13th and 11th Ahau, pestilence and small pox were in the castles. In the 13th Ahau, Chief Ajpula died; six years were wanting to the completion of the 13th Ahau; this year was counted toward the east of the wheel, and began on the 4th "Kan." Ajpula died on the 18th day of the month Zip, in the 9th Ymix; and that it may be known in numbers, it was the year 1536, sixty years after the destruction of the fortress.

§ 13. Before the termination of the 11th Ahau, the Spaniards arrived, holy men from the east came with them when they reached the land. The 9th Ahau was the commencement of baptism and Christianity; and in this year was the arrival of Toroba (Toral), the first bishop. 1544 A. D.

Note.—This Manuscript has also an introduction and close, which Señor Perez has not published, because the dates specified occurred in the Spanish epoch, and consequently were of no interest to the Maya student.

History of the Manuscript.

In the interest of authenticity it is much to be regretted that neither the name of the author, his residence, nor the date when the Manuscript was written, are known to us, and we are also ignorant of other matters of moment; whether the Manuscript is an original or a copy, or how often copied, or by what family or person it may have been preserved before it came into the hands of Don Juan Pio Perez. That Yucatecan gentleman had retired from Mérida, the capital, to the District of Peto, to devote himself to his favorite studies, the ancient language and the history of his nation. The unusual interest that he showed in this direction, united to his influential position as first officer of

the district, enabled him to obtain many small manuscript documents known to have been written by the natives in their vernacular language, the Maya, soon after the time of the conquest, which, for the most part, contained historical reminiscences of the time of the supremacy of their ancestors. Among these manuscripts there was a so-called *Chilam Balam Calendar*, which, in the form of an appendix, contained, besides, the outlines of the primitive history of Yucatan. It was, indeed, but a brief epitome of historical events, accompanied by the corresponding dates. But its value consisted in the circumstance that these dates were catalogued according to successive epochs; and it required only slight inspection to disclose the fact that they extended back to a period not very distant from our Christian Era.

This was a discovery to the learned world as welcome as any that could be made. It was unique in its kind. All attempts, thus far, had vainly sought to learn something about the history of the builders of those palaces and temples with whose ruins the peninsula was covered at the date of the arrival of the Spaniards, and which pointed to a long past and to the unceasing activity of a numberless population, which, while it was skilled in the most important branches of art and industry, and familiar with a luxury such as only ancient Asia and India had displayed, was yet governed by a despotic and hierarchical power. The native, when asked whose work the ruins were, would answer nothing but that they owed their origin to men who, in ancient times, had immigrated from far distant countries.

The Manuscript disclosed at once the history of these strange immigrants, showed the progressive march of the conquest, and the contemporaneous foundation of the largest cities then in ruins, and furnished in the Maya language the chronology of each event and its corresponding epoch. By means of his extensive antiquarian knowledge Señor Perez made an exact translation of this Manuscript into Spanish, and afterwards undertook a critical interpretation

of its contents, and accompanied the whole with an introductory explanation of the system of ancient Maya chronology.

In the midst of these labors he was surprised by the arrival of the celebrated American traveller and archæologist, John Lloyd Stephens, and was induced to entrust to him a copy of the MSS. and interpretations to be embodied in his work on Yucatan, in order to bring them more fully before the world. His wishes were scrupulously complied with, and the Spanish translation has been rendered into literal English by Mr. Stephens in "Incidents of Travel in Yucatan," vol. I., Appendix, pages 434–459, and vol. II., Appendix, pages 465–469.

Mr. Albert Gallatin, who, of all American students, has made himself most thoroughly acquainted with what remains of the historical elements of the Nahuatl and Maya people, has brought together the results of his investigations in a lecture published in the "Transactions of the American Ethnological Society," New York, 1858, vol. I., pages 104 114. The information therein contained attests an entire familiarity with the method pursued by Señor Perez in his commentary, without, indeed, undertaking any severe criticism of it. In our opinion Mr. John L. Stephens and Mr. Gallatin are the only Americans who have recognized Señor Perez's merits in an unequivocal manner, and have brought them to the knowledge of the world.

This is all we could learn about the Manuscript, nor have we been able to form a supposition, much less to discover in the text itself any clue to the source from which the unknown Maya author could have drawn his data. At the end of the Manuscript Señor Perez gives his opinion that the whole was written from memory, because it must have been done long after the the conquest, and after Bishop Landa had publicly destroyed much of the historical picture-writing of the Mayas by an *auto-da-fé*, and because the whole narration is so concise and condensed that it appears more like an index than a circumstantial description of events.

These opinions of Señor Perez might cast a well grounded suspicion on the authenticity of the manuscript. We shall try to remove such doubts, at once, by presenting the following considerations. We do not believe that Bishop Landa succeeded in burning the entire treasures of Maya literature at the notorious *auto-da-fé* in the town of Mani in 1561. The authorities* to which we have access describe the number of the destroyed objects so precisely that we have every reason to confide in their correctness. We read of 5,000 idols of different size and form, 13 large altar stones, 22 smaller stones, 197 vessels of every form and size, and lastly of 27 rolls (*sic*) on deerskin covered with signs and hieroglyphics, given to destruction at that time and place. We may believe that the terrorism exercised by Bishop Landa had a powerful influence on the minds and on the newly converted consciences of the natives, and the Bishop no doubt used every possible means to get into his hands as much as he could of what he considered to be "cabalistic signs and invocations to the devil." But we can never believe that these 27 rolls represented the entire Maya literature, collected for hundreds of years with the greatest care and held sacred by the natives. Such a wholesale destruction would have been an impossibility. We could refer to a similar occurrence that took place in Mexico; and though Bishop Zumarraga has the bad reputation of having destroyed all the picture treasures of the Nahuatls by an *auto-da-fé*, there were notwithstanding so many of them in existence soon after his time in the possession of native families that Ixtlilxochitl, Tezozomoc, and others, were able to build up their detailed accounts of the primitive history of their country from these original sources. Possibly numbers of them may have been preserved among the Maya tribes, for only under such favorable conditions could Cogolludo, Villagutierre and Lizana have obtained

*Historia de Yucatan, Eligio Ancona, Mérida, 1879, Vol. II., page 78.

the valuable information and material which form the chief interest of their labors and researches, and which enabled also Pio Perez in the year 1835, to discover material from which to interpret so complete a description of the system of Maya chronology. Nay, even, we have a suspicion that Bishop Landa may have laid aside the most important part of these records, or what was the most intelligible to him, for we cannot comprehend how he would have been able without these pictures before his eyes to present in his work the symbols for the days so correctly, and also those for the months, or how otherwise he could have written his work in Spain, so far removed from all sources of information and from consultation with the natives.

No reason, therefore, exists why the Maya author should not have remained in possession of some painting, which exhibited the annals of his forefathers. If, however, he was compelled to write his "Series of Katunes" from memory, there is no reason for not relying on the accuracy of his retentive faculties alone. The noble Indians, and he belonged undoubtedly to this class, were very particular in training their sons to learn by heart songs expressing the glorious deeds of their ancestors. It is a fact attested by the Spanish chroniclers, that these songs were recited publicly in the temples and on solemn religious occasions. They were the only kind of positive knowledge with which we know the brains of the Indian pupils were burdened. In either case, therefore, the accuracy of the written Maya report needs not be doubted, at least not on the grounds alleged. Had it been composed in the Spanish language instead of Maya, we should have viewed this circumstance with a more critical eye. But as the native under Spanish rule expressed it in his native language, this kind of loyalty appears to us to give a certain warranty of dealing with a man who described the traditions of his oppressed race, and who wished to perpetuate its memory by handing down to posterity the principal events of the past history of his nation.

At this place, we should not like to omit pointing out an interesting suggestion which the clear headed and sagacious author, Señor Eligio Ancona* made in his before mentioned work, that Bishop Landa and the author of the Manuscript agree so often in their mention of historic dates, in the manner as well as the matter, as to lead to the idea that both drew their information from the same source. Whatever be its origin, we agree with the views of Señor Perez, that, in spite of the deficiency and breaks occurring in the Manuscript, it deserves critical attention as the only document thus far discovered that gives information of the early history of Yucatan.

Elements of Maya Chronology.

It is impossible to understand the Manuscript before obtaining a knowledge of the division of time prevalent in Yucatan before the Spanish Conquest. Señor Perez has the incontestable merit of having been the first to lay before the world not only the chief points of the system but also all the technical details. Before his time but little was known of Maya chronology. From the great historic works of Torquemada, Herrera and Cogolludo, we learn only that the Mayas, in conformity with the Mexicans, held that the solar year was composed of 360 days, and when these were passed they added 5 days more as a correction. We are told that both nations divided their years into 18 months, and their months into twenty days each. As to the longer periods of time, however, we hear of certain differences. While the Mexicans had an epoch of

*Historia de Yucatan, Eligio Ancona, Mérida, 1879, Vol. I., page 156. "Landa in Relaçion de las cosas de Yucatan, § viii., also speaks of the tranquillity and good harmony which reigned among the chiefs of those cities, and we notice that concerning the epochs referred to, his report is in accordance, in many details, with that of the anonymous author of the 'Maya Epochs.'"

52 years which they divided into 4 smaller periods, the so called *Tlapilli*, each of 13 years, the Mayas counted a great epoch of 260 years, the so called *Ahau Katun*, subdivided into 13 smaller periods each of 20 years, with the simple name *Ahau*. This period of 20 years was according to Cogolludo* subdivided again into what he calls *lustra* of 5 years each, but he does not give the native name of this division.

**Diego Lopez de Cogolludo*, Historia de Yuacathan. Madrid, 1683, Lib. IV., Cap. 5. "The count they kept in their books was by 20 to 20 years, and also by *lustros* of 4 to 4 years. When five of these lustros had passed, or twenty years elapsed, they called this time *Katun*, and set one hewn stone *(piedra labrada)* upon another, well cemented by lime and sand. This can be noticed in their temples and ecclesiastical buildings, and especially on some ancient walls of our convent in Mérida, upon which the cells have been built."

The expression Katun, mentioned in this passage, and to which we have assigned a place in our title, requires a few words of explanation. As far as we know, it occurs only three times in our Central American authors; in Cogolludo, Landa, and in our manuscript. The first gives Katun the meaning of a period of twenty years. The second (§ XLI.), uses the following phraseology: "Contando XIII. veyntes con una de las XX. letras de los meses que llaman Ahau, sin orden, sino retruecandolos como pareceran en las siguiente raya redonda, llaman les a estos en su lengua Katunes." This phraseology is somewhat obscure, nevertheless it will be admitted that his intention was to state that each of the images of the thirteen Ahaues, depicted on the surface of the wheel, represented twenty years, this being a period which they also called Katunes. We arrive at this definite conclusion by the consideration that if Landa says that the period of twenty years was called *Ahau*, and another one, that of 260 years, *Katun*, he would have stated the latter fact in expressive words; the occasion for doing so being too urgent to let it pass. The third author uses the word *Katun* in his introductory lines, without giving it any numerical value. But it will be noticed that in the text which follows, the expression *Katun* is used interchangeably with that of Ahau for a period of 20 years. This concordance of the three authors allows us to conclude that whenever the word *Katun* is employed, the short period of 20 years was meant. In this connection a question arises: How is it that no author has made mention of the long period of 260 years, with which we become acquainted in Señor Perez's chronological essay. It is probable he found it mentioned in some Maya manuscripts in which this long period appeared under the name of *Ahau Katun*. Though this fact of itself may be con-

The discovery of the Manuscript, no doubt, induced Señor Perez to make a systematic and detailed sketch of the early native chronolgy of his country. We shall mention only the most interesting and important of his details and refer the reader for the rest to Stephens' work already mentioned. The names of the 20 days in the month are as follows:—

1 Kan.	6 Muluc.	11 Gix.	[3]16 Cavac.
2 Chicchan.	7 Oc.	12 Men.	[4]17 Ahau.
3 Quimij.	8 Chuen.	13 Quib.	[5]18 Ymix.
4 Manik.	9 Eb.	[1]14 Caban.	[6]19 Yx.
5 Lamat.	10 Been.	[2]15 Edznab.	[7]20 Akbal.

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sidered of no importance, still, as it would bring to light another of the many numerical combinations (13×20=260) in which those people indulged, with the fundamental figures of their calendar system, we must feel a great interest in the asserted fact, hoping it will turn out to be a correct statement. Our researches have been directed for a long time towards the discovery of the symbols which the Maya annalists or sculptors would have employed for their chronological periods. It was in connection with these studies that we discovered the Nahuatl symbols for the same, of which we gave account in our discussion on the Calendar Stone. Yet while this discovery only corroborates the suspicion long entertained that a certain set of Maya symbols represented the lustra of 5, and another the period of 20 years, we have not yet been able to recognize a Maya symbol for the period of 260 years.

The word Katun is a compound of *Kat*, to ask, to consult, and *tun*, stone; hence the stone, which when asked, gives account. Thus it was also understood by Cogolludo, who, when mentioning the word *Katun* (see above), was referring to the square stones incrusted into walls, upon which the convent was built. What traditions he followed in this is still better illustrated by the words in continuation of this passage: "In a place called Tixualahtun, which means a spot where one hewn stone is set upon another one, the Archives of the Indians are said to have existed, to which they resorted for all questions of historical interest (recurso de todos los acaecimientos), as we should do to Simancas, in Spain." The stone columns found on the spot named, can be seen pictured in J. L. Stephens' Incidents of travel in Yucatan, Vol. II., page 318.

The 18 months were as follows :—

1 Pop (16th of July.)
2 Uoo (5th of August).
3 Zip (25th of August).
4 Zodz (14th of September.
5 Zeec (4th of October).
6 Xul (24th of October).
7 Dze-yaxkin (13th of November).
8 Mol (3d of December).
9 Dchen (23d of December).
10 Yaax (12th of January).
11 Zac (1st of February).
12 Quej (21st of February).
13 Mac (13th of March).
14 Kankin (2d of April).
15 Moan (22d of April).
16 Pax (12th of May).
17 Kayab (1st of June).
18 Cumkū (21st of June.

As the table shows their year began with the first day of the month Pop, which corresponded to the 16th of July in our calendar, when, as Señor Perez observes, the sun was almost vertical over the Peninsula. The day itself was called *Kin*, Sun, the month U, Moon, and the 5 intercalary days were called nameless days, *Xona-Kaba-Kin*, not-name-Sun.

In the arrangement of their yearly calendar the Mayas proceeded as follows: Like the Mexicans they used a combination of the numbers 1 to 13, with the names of the 20 days of the month. They called the first day of the month Pop (our 16 July) 1 Kan, the second 2 Chicchan, the third 3 Quimij, and so on. The fourteenth day was called 1 Caban, the fifteenth 2 Edznab, and the last or twentieth day 7 Akbal. The first day of the second month followed in correct numerical sequence with the name 8 Kan, the second with the name 9 Chicchan. Thus repeating the 20 names of the days with the above combination of numbers from 1 to 13 they reached the 360th day with the name 9 Akbal. Then followed the intercalary week of 5 days bearing the names 10 Kan, 11 Chicchan, 12 Cimij, 13 Manik, and 1 Lamat.

The second year begins with 2 Muluc. In the same manner going on with the combination the first day of the third year was 3 Hix, then followed 4 Cavac, 9 Kan, 10 Muluc, 11 Hix, 12 Cavac, 13 Kan, 1 Muluc, 2 Hix, and so on. At the end of the 52d year the above-mentioned combination was ex-

hausted, for the 53d year began again with the day 1 Kan.

Names of the Months.	Pop.	Uoo.	Zip.	Zodz.	Zeec.	Xul.	Dze-yaxkin.	Mol.	Dchen.	Yaax.	Zac.	Quej.	Mac.	Kankin.	Moan.	Pax.	Kayab.	Cumkú.
Names of the Days.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Kan,	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3
Chicchan,	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	4
Quimij,	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5
Manik,	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6
Lamat,	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7
Muluc,	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8
Oc,	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9
Chuen,	8	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10
Eb,	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11
Been,	10	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12
Gix,	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13
Men,	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1
Quib,	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8	2
Caban,	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3
Edznab,	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	4
Cavac,	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5
Ahau,	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6
Ymix,	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7
Yk,	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8
Akbal,	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9

The following year must begin with 2 Muluc.

Each week had 5 days { Kan . . . . 10 | Chicchan . 11 | Quimij . . 12 | Manik . . 13 | Lamat . . 1

It is to be observed here that this arrangement of a calendar of epochs agrees with that in use in the interior of Mexico. There, the numbers from 1 to 13 were combined with four names, Tecpatl, Calli, Tochtli and Acatl, which they had taken, like the Mayas, from the names for the 20 days of the month; and both calendars represent the first days of their weeks of five days as occurring upon the 1st, 6th, 11th and 16th days of the month. From this system

Señor Perez arrives at the division into great epochs of 52 years used in Mexico as well as in Yucatan. This statement appears hazardous in the highest degree when compared with the statements made by the before-mentioned authorities. They claim for Yucatan an epoch of 20 and 260 years respectively; and Landa, who wrote with the first impressions of the conquest still fresh in his mind, and whose information came directly from the natives themselves, agrees with them. Without doubt Señor Perez must have been aware of this contradiction. After he had developed in § 7 the so-called epoch of the Mayas of 52 years he makes us acquainted with this national Maya epoch, though, as we shall presently learn, he disagrees with the Maya writers as to the time of its duration. His statement is: § 8. "The Yucatecans, besides the great cycle of 52 years, employed still another great cycle, which had reference to certain portions of it, in order to date the main epoch, and the most notable events of their history. Each of these cycles contained 13 periods, of 24 years each, making together 312 years. Each period, or *Ahau-Katun* was divided into two parts. The first of these parts of 20 years was enclosed in a square (*sic.*), and was called on that account *amaytun*, *lamayte* or *lamaytun*. The second part of 4 years formed, so to speak, a pedestal for the first part, and was called *chek oc Katun*, or *lath oc Katun*, which signifies a *chair* or pedestal. These years were considered intercalary, and were held to be unlucky years. They were called *u yail Jaab*, and the same was the case with the 5 intercalary days to which they corresponded. The separation of the 20 years from the following 4 years gave rise to the erroneous idea that the *Ahaues* consisted of twenty years only, an error which has prevailed almost universally among those who have written upon this subject. But if they had counted the years which compose a period, and had taken notice of the positive declarations of the manuscript to the effect that the *Ahaues* consisted of 24 years

divided as above stated, they would not have misled their readers on this point."

Señor Perez continues:—

"It is an incontrovertible fact that those Maya periods, epochs or ages, took their name from *Ahau Katun*, for they began to be counted from the day which bore the name *Ahau*, the second day of those years, which began with the name *Cavac*. But as these days and numbers were taken from years which had run their course, the periods of 24 years could never maintain an arithmetical order, but succeeded each other according to the following arrangement of numbers: 13, 11, 9, 7, 5, 3, 1, 12, 10, 8, 6, 4, 2. As the Indians considered the number 13 the initial number, it is probable that some remarkable event had happened in that year, because, when the Spaniards arrived in the Peninsula, the Indians then counted the 8th as the 1st, that being the date at which their ancestors came to settle there; and an Indian writer proposed that they should abandon that order also, and begin counting from the 11th, solely because the Conquest had happened in that Ahau. Now, if the 13th Ahau Katun began on a second day of the year, it must be that year which began on 12 Cavac, and the 12th of the series. The 11th Ahau would commence in the year of 10 Cavac, which occurred after a period of 24 years, and so on with the rest; taking notice that after the lapse of years we come to the respective number marked in the course of the Ahaues which is placed first; proving that they consisted of 24, and not, as some have believed, of 20 years."

From the heading (§ 8), "*Of the Great Cycle of* 312 *years, or Ahau Katunes*," as well as of the text just quoted, it is apparent that Señor Perez intended to establish the fact that the ancient Maya cycles were composed of 24 and 312 years respectively. He does so in manifest contradiction to the prevalent opinion that they consisted of 20 and 260 years. We do not understand the reasons why he should have come to this conclusion. It grew out

neither from the facts alleged nor from the connection into which he wove them together. The peculiar circumstance of having, in his commentary references, four years intercalated in succession to the usual cycle of twenty years, and included in a square, to serve as a "*pedestal*" to the former, is not capable of shedding new light upon the question and causing us to distrust authorities on which we were accustomed to rely. The other reason, which stands second in his order of forming premises for his conclusion, is said to be the undeniable fact, that those periods took their name of *Ahau Katun*, because they began to be counted from the day Ahau, which was the second day of those years that began in *Cavac*. Of this uncontrovertible fact the readers are not elsewhere informed. The information, however, which we are able to give is that according to all we have been able to gather on the Maya Calendar, a period, or a single year, commencing with a day named *Ahau*, has never existed in their system of counting. They always commenced it with the words *Kan*, *Muluc*, *Hix*, *Cavac*. If there existed any exceptional ground for changing an old established method of dating, the reason should have been stated, for it is preposterous to assume that the first day of a great cyclical period should have taken its name from any other day of the year's calendar than from the four above named. Nor do we understand the reason why, just here, the topic of the succession of the numbers 13, 11, 9, 7, 5, 3, 1, 12, 10, 8, 6, 4, 2, was introduced. Could it have been with the intention of showing that this singular enumeration of alternating *Ahaues*, which we shall hereafter speak of, occurred only in cycles of 24 years, and that therefrom a proof might be derived for establishing the pretended cycle of 24 and 312 years? Evidence of this should have been given by a table showing the series, and by still another table in which should be shown that such an alternating succession did not occur in cycles composed of 20 years. Not one single fact can be

detected in Señor Perez's text, by which the long established assumption of a 20 years' cycle has been disproved.

Nevertheless, the data which we possess of the ancient Maya Calendar are not so complete as to disprove emphatically that a cycle of 24 and 312 years respectively was never used by the Maya chronologers.

Without doubt, Yucatan owed its ancient greatness to the success of uniting a rude and scattered population around a number of theocratical centres, where similar forms of worship were maintained. Though the ancient records are wanting, this feature of the Maya system stands out upon the background of dim traditions with great distinctness. After this concentration of tribes, and with the view of regulating worship, a uniform calendar would have been introduced, the main features of which would probably have been a solar year of 365 days, the division of the year into 20 months, and a cyclical period of 20 and 260 years respectively. In the middle of the 11th century great tribal revolutions took place on the high plateaus of Anahuac, by which the lowlands of Yucatan were also affected. An adventurous tribe of the Nahuatl stock possessed itself of one of the principal towns of Yucatan and established its influence and power. Mayapan became the centre of Nahuatl worship. The calendar the invaders brought with them must have been the old honored division of the years into 365 days, with 20 months, and their cyclical period of not 20 but 52 years, and it is also known that about the year 1450, the political union of the Mayas was broken into several smaller divisions, some of which presumably would have held to the ancient cycle of 20 years; others may have adopted the Nahuatl cycle of 52 years, and possibly, may have introduced the cycle of 24 years spoken of by Señor Perez. Political schism was likely to have generated also a hierarchical one, and each newly formed body of priests, in whose hands the custody and composition of annals fell, would have sought to distinguish themselves from their

predecessors by innovations, if only of a formal character. Such changes we also observe among the Nahuatls in Anahuac. The period of 52 years, however, seems to have constantly prevailed among them, and also the divisions of the 365 days into 18 months of 20 days each.

We find, for instance, that one of the Nahuatl tribes begins its annals with December 9, another selects December 26, another January 9, and others January 12, February 4, and February 22. We also know that a different calculation prevailed among these tribes in beginning their annals. The State of Colhuacan began its chronology with a year 1 *Calli*, the State of Mexico with 2 *Acatl*, others with 1 *Tochtli*, and seemingly the most ancient calculation began with the year 1 *Tecpatl*. Thus we have a historical basis for our assertion that the Nahuatl as well as the Maya tribes did not conform to a uniform rule in beginning their first year's date, in their chronological epochs, or in the division of their cyclical epochs.

In spite of this diversity, so perplexing to modern chronologists, the Aztecs and the Mayas were both governed by the same general principle in arranging their calendars. Both nations recognized the fact that in the past their solar year had numbered only 360 days; and they preserved in the words nemotemi and xona-kaba-kin, the remembrance of a not to be forgotten effort exerted by their ancestors to correct the primordial solar year of 360 days into one of 365 days. Both nations conscientiously kept on dividing the year into 18 months, and each of the months into 20 days, and with both the number 13 returns as a basis governing the calendar of years as well as that of periods.*

We notice, moreover, that both nations omit to count the 20 days of the month in the succession of the figures 1–20,

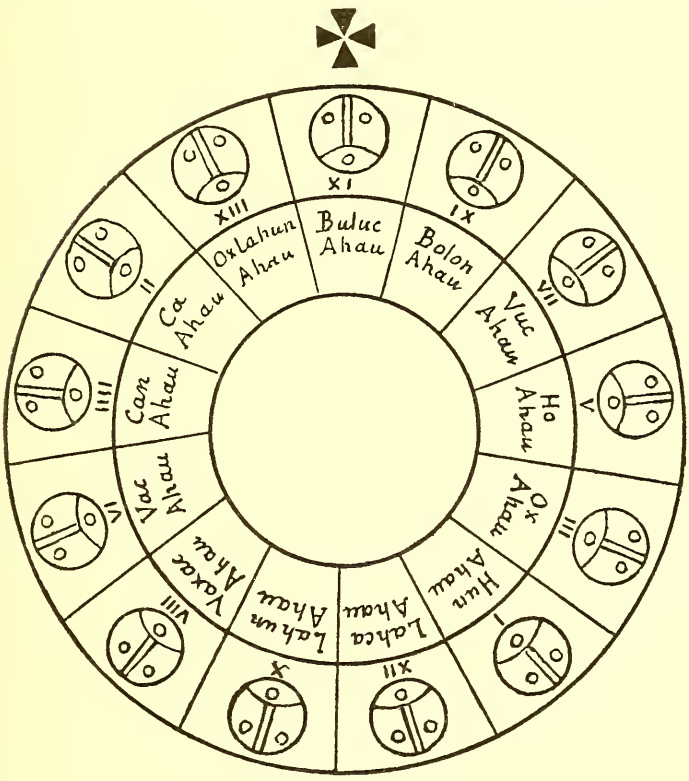
* Señor Orozco y Berra, the learned and laborious author of the "Carta ethnografica de México, México, 1864," has made this matter a subject of special investigation in "Anales del Museo Nacional de México," 1879, Tom. I., Entrega 7, page 305.

but after the thirteenth day they again begin with the number 1, and the 20th day therefore was figured with the number 7, and also that the Mexicans counted their smallest period with 13 years, the so-called *tlapilli*, and upon its quadruple the cycle of 52 years was based. The lesser Maya or *Ahau* period is 20 years, while the greater or *Ahau Katun* is 260 years or 13 times the smaller. Señor Perez's lesser period of 24, and the greater one of 312 years show the same method and calculation ($13 \times 24 = 312$).

This conformity between the early calendars of Central America should not escape the observation of the future historical enquirer. He will be compelled to adopt a very remote period of time when both nations, differing so entirely in their language, dwelt in peace, connected by the strong bands of a hierarchical power. One of these two nations, it is clear, must have invented it. Hence the question arises, was it original with the immigrating Nahuatl tribes who came from the higher northern countries as is reported, and did they succeed in forming such a consolidation with the Maya races as to mingle both under the same hierarchical government, or did the contrary take place? The most prevalent opinion makes the Nahuas the inventors of the general system of chronology, but later students begin to express themselves in favor of its Maya origin. On a more fitting occasion we are desirous to present our reasons for taking the latter view.

Before passing from these chronological speculations to the discussion of the Maya Manuscript, we wish to state briefly our idea of the origin of the system of reckoning by alternating Ahaues. [See page 66]. We promised to return to this subject, and shall now endeavor to give a solution to this chronological problem differing from that of Señor Perez. A passage in Bishop Landa's work, determined our decision. After a previous and positive assertion that the lesser Ahau period consisted of 20 years, Landa continues, ... "The order in which they com-

puted their dates and made their prophecies by the aid of this computation (of 20 years) was arrived at by having two idols, dedicated to two of these characters (*Ahaues*). To the first idol, which stands with a cross marked above the circle, they paid homage by making him offerings and sacrifices, in order to obtain an immunity from the calamities to come in these 20 years, but after ten of these years had passed they offered nothing but incense and worship. When the twenty years of the first were fully passed they began to



AHAU KATUN.

[Above we give a reproduction of a Maya Ahau Katun wheel taken from that in Landa's "Las cosas de Yucatan," § XL., in order that his explanation may be understood].

occupy themselves with the presages of their second idol and to offer sacrifices to him, having taken away their first idol to replace it by the second, in order to worship it in the coming ten years."*

"The Indians say, for example, that the Spaniards arrived at the City of Mérida in the year of the nativity of our Lord and Master 1541, which was precisely the first year of *Buluc Ahau* (11 Ahau), the same that we find placed at the top of the instrument† below the cross, and which also indicates that they arrived in the month *Pop*, which is the first in their year. Had the Spaniards not come as they did, then they would have placed the Idol of *Bolon Ahau* (9 Ahau), offering homage to it, and continuing to refer to the prognostics of *Buluc Ahau*, till the year 1561; and then they would take it from the temple and put in its place that of *Vuc Ahau* (7 Ahau), all the while continuing to refer to the prognostics of *Buluc Ahau*, for ten years more, and the same with the others until the tour was made. In this way they made up their Katuns of twenty and ten years, worshipping them according to their superstitions and juggleries, which were in such great numbers that there were more than enough to deceive that simple people, and there is reason for astonishment when one knows what kind of things in nature and experience belong to the Demon."

Whoever is acquainted with the awkwardness and literary negligence of Landa's writing will not be astonished that in

*Las cosas de Yucatan. Diego de Landa. Edition B. de Bourbourg. Paris, 1864. Page 315, § XL.

† A specimen of such an instrument with a surface inscribed as the cut shows would hardly have been preserved. We think that the box enclosed a round disk turning on a pivot; this contrivance, evidently served as an aid to the memory in enumerating the alternating Ahaues. To-day, we should obtain the same result by writing the Ahaues in a horizontal or vertical line, but the Nahuatls and Mayas, having solely a symbolical or pictorial manner of representation, made use of this ingenious arrangement by painting the series of the Ahaues on the circumference of a circle. Thus the idea of an uninterrupted sequence of time and the connection of the 2d Ahau with the 13th were brought to notice.

his statement he left out something which a more careful writer would have expressed, and placed at the head of his explanation. The wanting statement, however, can be supplied. It will be noticed that Landa in his text only refers to two Ahau Idols worshipped in the temple. But this number must have been 13, as is evident from the 3d Idol *Vuc Ahau*, mentioned afterwards in the statement with which he finished his description, in order not to always repeat the same thing of the ten other idols which are painted on the wheel. Let us then take the statement of Landa supplemented by what we have said above as to the questionable nomenclature of these Ahaues as they appear in the row of numbers 13, 11, 9, 7, 5, 3, 1, 12, 10, 8, 6, 4, 2. Landa's description gives us to understand that the lapse of twenty years was always required before the new combination of two idols was presented to the worshippers, and which had not before been seen in the temple in company with the former Idols. For example: When Idol 3 was placed in the temple, Idol 2 took a first place among the worshippers. Indeed, Idol 2 was in the temple with Idol 1, but Idol 3 was not with Idol 1, nor Idol 4 with Idol 2. If such a combination repeating itself after 20 years, represented a space of time familiar to the Mayas, it is natural that it should receive the name Ahau or period of the *god*,* and that it should receive its name from the number of the Idol presiding at the expiration of this space of 20 years. If therefore in the rotation of the circle Idols 2 and 3 passed out of the temple, the combination, or what is the same, the space of 20 years, during which they had ornamented the temple will have borne the name 2 *Ahau*, on the ground that Idol 2 had pre-

* Ahau translated means: soverain, king, august, principal. See page 3 of Juan Pio Perez's "Diccionario de la lengua Maya," published in Mérida in 1877, by the friends and faithful executors of the last will of the defunct scholar. This valuable work comprises the whole of the linguistical stock of the Maya language, the words collected exceeding the number of 20,000, on 437 pages, quarto. It may be purchased from Dr. George E. Shiels, 896 Broadway, New York.

ceded it. The second combination, then, would follow when the presidency of Idol 4 would have finished its term, and in this way the row 2, 4, 6, 8, 10, 12, 1, 3, 5, 7, 9, 11, 13, may have had its origin.

Now, it is true that the order in which these numbers stand is different from that transmitted to us, which begins with 13 and is followed by 11 and 9. The reverse of this method of reckoning may possibly be accounted for in this way: An epoch unknown to us may have occurred when the Maya chroniclers desired to review past events and bring them into order. Counting backwards from such a date they would have called the first period of twenty years not the 13th, nor, according to our above statement, the 1st, but the 2d Ahau. Consequently the period after the expiration of the great cycles of 260 years would have been called the 13th Ahau, though properly speaking it should have been the 2d Ahau. An historical epoch for such reckoning backward is known to have occurred. It occurred again in the year 1542, when the conquest of Yucatan by the Spaniards took place. It appears that the Mayas in that year declared their 13th Ahau period to be at an end, from 1522 to 1542; consequently a back reckoning, according to this system of the Mayas, gave a 2d Ahau for the period of 1502–22, a 4th Ahau for that of 1482–1502, and going on in the same way of reckoning the year 1282 would have represented the expiration of the 13th *Ahau*.

The circle of Landa exemplifies this manner of counting. He starts from the 13th Ahau, counting from left to right. But if we count in the opposite direction we should obtain the row of numbers 2, 4, 6, 8, &c., as we have shown above. If we refer to the striking discovery on the Mexican Calendar stone* that the days upon that circle are not counted

*Proceedings of Am. Antiq. Society, April 24, 1878, page 16, in an article on the Mexican Calendar Stone, by Ph. J. J. Valentini, in which mention was made of this singular kind of notation from the right to the left hand. A. v. Humboldt, in "Vue des Cordilléres," page 186, re-

towards the right but towards the left, and generalize it as a rule to be adopted also for the chronological cycles of the Mayas, we should come to the conclusion that the Mayas in some of their former chronological epochs counted their Ahaues in that natural order. Who shall say that the reversed counting did not originate from a misunderstanding on the part of the Spaniards? We do not claim to have finally disposed of the question. Every new attempt will be a welcome addition to the cause, for each new investigator is obliged to descend deeper into the dark mine where Maya history lies buried.

Señor Perez's Translation of the Manuscript.

Señor Perez is thus far the only interpreter of the Maya Manuscript, and his Spanish text found a skilful translator in Mr. John L. Stephens. Neither the Spanish text nor the special chronological analysis of each paragraph composed by Señor Perez, have hitherto been made public; we owe the possession of both these documents to the kindness of our friend, Dr. Carl Hermann Berendt, lately deceased, who, during his long residence in Yucatan, was occupied in amassing a large collection of matters relating to Maya literature and history, in original form or in authentic copies. In comparing the Spanish with the English translations, it seems that many things, not clear in the first, had been made more intelligible in the last. It is evident that Señor Perez sought to translate the Maya text as liter-

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marks: Le cercle interieur offre les vingt signes du jour: en se souvenant que Cipactli est le premier et Xochitl le dernier, on voit qu'gu'ici, *comme partout ailleurs*, les Mexicains ont rangé les hiéroglyphs de droite à gauche." The great scholar has clothed in the form of a proven statement that which at the beginning of this century was an opinion generally prevalent among Americanists, and which does not bear the test, when the numerous copies existing of the Mexican calendar days are examined. They all show the arrangement of the days from the left to the right. The sculptured calendar is the only exception.

ally and faithfully as he could into the Spanish language, otherwise his text would have been more fluent and finished. The abruptness of expression, and the frequent ellipses in the construction of its sentences, show that the Maya idiom has been faithfully rendered. Such a course increases the interest, and at the same time it creates confidence in the correctness of the translation. Dr. Berendt, the profound scholar of the Maya language, wrote us as follows on March 14, 1873: "I have several times undertaken to translate this manuscript myself, but have always given up the task. The manifold doubts which the original text leaves open seem to me correctly solved by Señor Perez, and it always appeared to me that I might indeed make another but not a better translation. The small changes in the text of Stephens, of which you speak, I do not believe were introduced merely from a love of his own expressions. I believe that he first came to an understanding with Perez, and sought only to assist the better comprehension of the manuscript for the benefit of the public at large."

It is to be hoped that the differences of translation of the manuscript spoken of above, and to which Señor Eligio Ancona* draws attention, will be critically investigated and finally decided by the coming generation of scholars in Yucatan. The sons of the country should be the born judges of the language and the spirit of the literary relics of the indigenous race. Recent investigations have shown that this language was split into sixteen dialects, which were spoken by as many tribes, whose territories extended far beyond the present area of the Yucatecan peninsula.† Like all languages, these Maya idioms have undergone changes during the last three or four centuries. To understand and

*Historia de Yucatan; by Eligio Ancona, Mérida, 1879, Vol. I., page 159.

† Remarks on the Centres of Ancient Civilization in Central America. Address read before the Amer. Geogr. Society, New York, July 10, 1876, by Dr. C. Hermann Berendt.

explain their now obsolete elements, must be left exclusively to the native scholar.

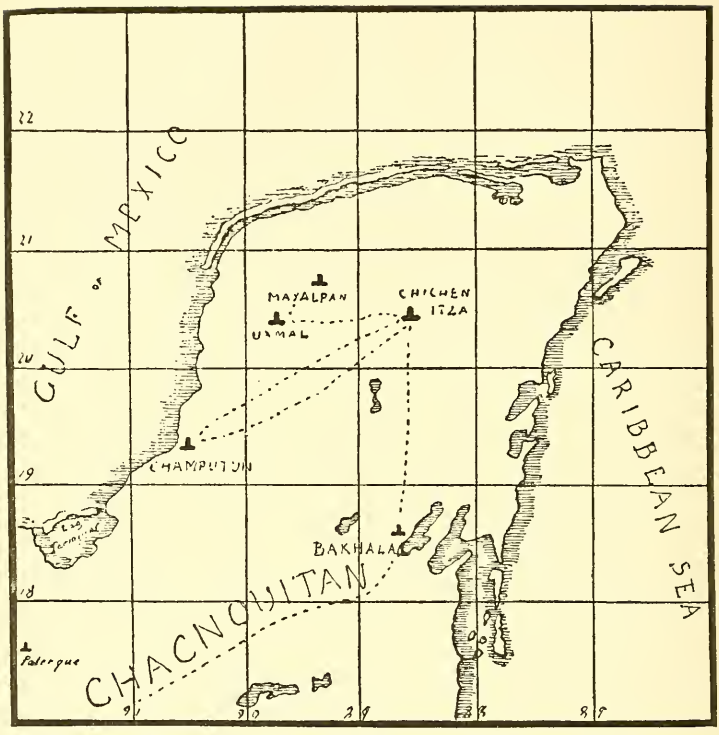
Discussion of the Manuscript.

It will now be our task to endeavor to clear away such doubts as may arise in regard to the chronological interpretation of the Maya Manuscript. These doubts have reference, first, to the choice of the method to be pursued in reckoning the Ahaues either at 24 or at 20 years. Second, as to the manner of filling up certain gaps which the author has left open in the chronological sequence of the Ahau period; and finally, after building again this chronological structure in its logical order, we must adapt the dates expressed in Ahaues to the current language of our Christian chronological era.

In order to avoid troublesome reference to the text of the preceding pages, we shall repeat the English translation, and for better convenience, shall present two or more sections together. To demonstrate Señor Perez's system and method of counting, we shall give the translation of the Spanish text, as communicated by Dr. Berendt, without undertaking to make any special criticisms of it.

This is the series of Katuns that elapsed from the time of their separation from the land and house of Nonoual, in which were the four Tutul Xiu, lying to the west of Zuina, going out of the country of Tulapan.

With these few words the Maya author states his purpose. He wishes to enumerate the Katuns or periods of time from the beginning of the history of his nation to the arrival of the Spanish conquerors. He tells us that his nation lived in a land called Tulapan, which was westerly from another called Zuina, and that from thence, under the lead of four chiefs, the Tutul Xiu, they had immigrated into this new country, Yucatan.



[Map showing the movement of the Mayas as stated in the Manuscript].

By Tutul Xiu the author evidently means the name of the reigning family, which, at the arrival of the Spaniards, were considered as the ancient rulers and hereditary lords of Chichen-Itza.* In regard to the countries referred to by the names Tulapan and Zuina, we can only say that in Central American traditions the name Tulapan oftentimes re-

* Herrera, Decade IV., Lib. X., Chapt. 2, 3 and 4. These three chapters are a compilation of data concerning the ancient history of Yucatan, and the adventurous career of the Itza race, which appear to be drawn from sources unknown at this day, and which are independent of what we can learn from Landa, from the author of the Maya Manuscript, and from Cogolludo.

turns under the form of Tulan. Thus, for example, the Quichés and Cakchiqueles, sister nations of the Mayas, make mention of the above countries in their annals.* Upon a closer examination of the text, contained in the so-called "Popol Vuh," we were unable to detect any grounds for the assumption that these countries or places lay in a distant orient. They probably will turn out to have been, or by the annalists were thought to have been, situated on the northern boundaries of Mexico, on a route of migration ending with the high plateaus of Guatemala.

§1. *Four epochs were spent in travelling before they arrived here with Holon Chantepeuh and his followers. When they began their journey towards this island, it was the 8th Ahau, and the 6th, 4th and 2d were spent in travelling, because in the 1st year of the 13th Ahau they arrived at this island, making together eighty-one years they were travelling between their departure from their country and their arrival at this island of Chacnouitan. These are* 81 *years.*

We learn that four Ahau periods had passed the 8th, 6th, 4th and 2d before the wanderers arrived with their leader, Holon Chantepeuh, at the island of Chacnouitan. In the following 13th Ahau they are said to have been already settled there. It is of the highest importance to note that the Maya author here acknowledges that he reckoned each Ahau period as 20 years, and he remains faithful to this method to the end of the manuscript. By this fact alone, we should be compelled to follow the division of 20 years thus established, even if in contradiction to the statements of other chroniclers, which fortunately is not the case.

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* Traces of such a migration and succeeding halting places can be discovered in the Quiché annals, edited by Brasseur de Bourbourg, with the title of *Popol Vuh.* "Popol Vuh, le livre sacré et les mythes de l'antiquité centro-Americaine," Paris, 1861, on pages 83, 235, 241, and pages 215, 217, 236, in which names are quoted and regions described which give evidence of a course of migration from northern to southern Mexico.

As the author treats of the affairs of the Tutul Xiu or the so-called Itza race, and attributes to them the discovery and colonization of Yucatan, it is highly probable that he made use of the annals of the Itzaes, and that they were arranged in periods of just 20 years. If we should be right in this assumption the 20-year period must be regarded as the most ancient ever used in Yucatan.

We cannot fully agree with Señor Perez and his countrymen that the author intended to designate the peninsula of Yucatan when he speaks of the Island of Chacnouitan. This name appears for the first and only time in this manuscript. It is generally acknowledged that the name had never previously been heard of.* We should state that the words of the text are always *nay ti petene Chacnouitan*. If in Maya *peten* meant only a peninsula, we should take no exceptions. But the fundamental meaning of *peten* is an island, and as the demonstrative pronoun *nay* means as well "of this place" as "of that place," the translation could as well stand for "that distant island." Whether the island was situated in the ocean or in any of the many inland lakes, the probabilities seem to lie with the latter supposition, for they came by land. Had they come by sea, tradition would have dwelt with some characteristic remark upon such an exceptional case. From the following paragraph it will become still more evident that the Chacnouitan discovered by the Itzaes was neither the whole nor the northern part of Yuca-

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* *E. Ancona, Historia de Yucatan, Vol. I., page* 34. Mérida, 1879.— "The word Chacnovitan or Chacnouitan first appeared in the Maya MSS. or series of Maya epochs. Upon examining this document, and observing that the tribe wandered from Tulapan to Chacnouitan and later to Bakhalal and from there to Chichen-Itza, etc., it will be understood that the name in question was given to no other portion of our peninsula than to that which lies at the south. Brasseur de Bourbourg supposes, and we think not without reason, that Chacnouitan lay between Bakhalal and Acallan, s. e. of the Laguna de los Terminos.—See Brasseur de Bourbourg, Archives de la comission scientifica, Tomo. I, page 422, note 2."

tan, but a district situated in the southwest of the peninsula.

§2. *The 8th Ahau, the 6th Ahau, in the 2d Ahau arrived Ajmekat Tutul Xiu, and ninety-nine years they remained in Chacnouitan—years* 99.

§3. *In this time also took place the discovery of the Province of Ziyan-caan or Bacalar; the 4th Ahau and the 2d Ahau and the 13th Ahau, or sixty years they had ruled in Ziyan-caan when* THEY CAME HERE. *During these years of their government of the Province of Bacalar occurred the discovery of the Province of Chichen-Itza. These are years* 60.

As the first section closed with the arrival at Chacnouitan, which took place upon the 2d Ahau, it was to be expected that the second section would continue the sequence of Ahaues so as to connect with the necessarily following 13th Ahau. But we see that it begins with the 8th Ahau, follows with the 6th and closes with the 2d Ahau.

Before taking notice of the accounts given in these two paragraphs let us first ascertain what Ahaues were left out between the 2d Ahau, at the end of the first section, and the 8th Ahau, with which the second section begins. According to the rule above given on the alternating Ahaues, the missing ones would be the following: The (13), (11), (9), (7), (5), (3), (1), (12), and (10th) Ahau. Of these nine Ahaues, or 180 years, the author had nothing in mind to tell us. No event of significance appears to have taken place. Perhaps the wanderers had to rest to gather strength before attempting further conquests. Moreover, this time belongs to the most ancient epochs of Maya history, and information regarding it was so dim and so obscure that it appeared to the author as of no account. The chronological sequence thus being established, let us now turn to the contents of the two sections, 2 and 3. They begin with the 8th Ahau and close with the 13th Ahau. As to the events happening

within the 8th, 6th, 4th, 2d and 13th Ahau, they indeed do not appear in the wished for sequence. But the sequence, as will be shown, can be established without making interpolations. It will be noticed that in section 2 the 4th Ahau is not mentioned. After having quoted the 8th and 6th Ahau, the author passes over this 4th Ahau and mentions the arrival of Ajmekat, belonging to the family of the renowned Tutul Xiu, who seems to have led in the conquests of Bacalar and Chichen-Itza, which are recorded in section 3, as happening in the 4th, 2d and 13th Ahau. That these conquests must be counted into the epoch mentioned with the names 8th, 6th, 4th, 2d and 13th Ahau is clearly expressed by the words, "*in this time*," so that no mistake can take place as to the intimate connection with the arrival of Ajmekat. We learn moreover that the time which the conquerors remained in the province of Chacnouitan is said to have been 99 years. These 99 or 100 years cover exactly the time represented by the above five Ahaues, and when reading at the end of the 3d paragraph that they had ruled 60 years in Ziyan-caan Bacalar, it becomes clear that these 60 years are not years that follow the 99 years, but that they were the last years of the 99 mentioned. The two sections supplement each other, and from them the following impression is conveyed, that Chacnouitan was the territory situated southwest of the shores of the great lagoon of Bacalar. The wanderers had been waiting during eleven Ahaues, from the 13th to the 4th Ahau, before they made an attack against the possessors of Bacalar. An attempt to take it appears to have been made during the 8th, 6th and 4th Ahaues, and only accomplished in the 2d Ahau, through the arrival or help of Ajmekat, who led them further on to the discovery or conquest of Chichen-Itza, in the 13th Ahau.

The difficulty of interpreting the two sections is removed as soon as we view them in the light of the reasons given, not as two distinct epochs of which the one follows the other,

as Señor Perez does (see commentary), but as belonging to one and the same epoch from the 8th to the 13th Ahau. It must not be so much questioned what the author ought to have done in order to represent his history in a logical way, *and on account of his omissions cast a doubt upon the whole record*, as how to use what he has left to construct a system from these elements, and to avail ourselves unhesitatingly of the help of the chronological sequence of Ahaues, which is and will remain the only reliable thread to lead us through and out of the labyrinth.

Commentary of Señor Perez.—"The manuscript informs us that at the 8th Ahau a colony of Toltecs under their leader Holon Chantépeuh, marched out from the city of Tulapan, and that in their wanderings they spent 4 Ahaues, 8, 6, 4, 2, till they came to Chacnouitan, which happened in the first year of the 13th Ahau. To doubt this is not possible, for this statement is the beginning and foundation of all later dates. According to my calculation which I will explain hereafter, it was from the year 144 to 217, which is 97 and not 81 years, as the manuscript reports, for if we *compute* the Ahaues with 24 years, as we have shown, and include the first year of the Ahau following as the time of their arrival, then the account makes 97 years. They stayed in Chacnouitan with Ajmekat Tutul Xiu during the remaining years of the 13th Ahau, until the 2d Ahau.

These Ahaues, as we have explained, should follow in the order 13, 9, 7, 5, and not 13, 6, 8, 2, for this latter list represents earlier Ahaues, and as they represent different epochs they can only be expressed by the same figures after the expiration of 312 years, thereby clearly showing the error.

It is likewise asserted that they remained 99 years in Chacnouitan, which could not have been true, for this would have made 119 actual years, or only 95 years if we reckon only four Ahaues, without the second, for if we regard the succession we miss the 4th Ahau, which the manuscript has left out. But the manuscript does not count four but five Ahaues, as it reckons an Ahau at 20 years, the five *Ahaues* less one year make the aforesaid 99 years."

§4. *The* 11*th Ahau*, 9*th*, 7*th*, 5*th*, 3*d and* 1*st Ahau*, *or* 120 *years*, *they ruled in Chichen-Itza*, *when it was destroyed*, *and they emigrated to Champutun where the Itzaes*, *holy men*, *had houses.* *Years* 120.

§5. *The* 6*th Ahau they took possession of the territory of Champutun*, *the* 4*th Ahau*, 2*d*, 13*th*, 11*th*, 9*th*, 7*th*, 5*th*, 3*d*,

1*st*, 12*th*, 10*th and* 8*th*, *Champutun was destroyed or abandoned. The Itzaes reigned two hundred and sixty years in Champutun when they returned in search of their homes, and they lived for several Katuns in the uninhabited mountains.* *Years* 260.

§6. *The* 6*th Ahau*, 4*th Ahau*, *after* 40 *years they returned to their homes once more and Champutun was lost to them.* *Years* 40.

The fourth section, in correct sequence, continues the series from the 13th Ahau when Chichen-Itza was founded. It covers the 11th, 9th, 7th, 5th, 3d, and 1st Ahau, a space of 20 years, in which the wanderers make the new region of Chichen-Itza their metropolis. Enemies, however, whose names are not indicated, destroy the place and oblige them to look elsewhere. They then turn to Champutun (now Champoton, also Potonchan), situated in a southwesterly direction from Chichen-Itza, on the westerly shore of the Peninsula.

The fifth section should begin with the 12th Ahau, but instead it follows the 6th Ahau. Hence the (12th), (10th) and (8th) Ahau are missing. These 60 years may be supposed to be the time required by the exiles to recuperate their strength in order to conquer the new territory of Champoton. In the 6th Ahau then they succeeded in taking Champoton, and they remained there during the 4th, 2d, 13th, 11th, 9th, 7th, 5th, 3d, 1st, 12th, 10th and 8th Ahaus, a full *Ahau-Katun* epoch of 260 years. They were obliged to leave Champoton in the 8th *Ahau*, and seemed willing to return to their old home, but determined to reconquer Champoton. We are told in the sixth section that two Katuns or 40 years, were passed in delays and preparations, correctly figured by the 6th and 4th Ahau; that they then made an attempt to reconquer Champoton, failing in which, they were obliged to look about for a new home.

Commentary of Señor Perez to the 4th, 5th and 6th Sections.—They remained in Chichen-Itza and ruled there until it was destroyed,

when they betook themselves to Champoton. Here they built their houses during the 11th, 9th, 7th, 5th, 3d and 1st Ahaues *(sic)*. If this succession should be stated correctly it would be the 10th, 8th, 6th, 4th, 2d and 13th Ahau, or from the year 452 to 576, A. D., when the 13th *Ahau* expired. The Ahaues represented the years 432, 456, 480, 504, 528 and 552 A. D.

§5. In the 6th Ahau they took Champoton and held sway there during the following twelve Ahaues until it was destroyed. After this they looked again for a home after they had passed several Katunes in the mountainous regions, which were the 11th, 9th, 7th, 5th, 3d, 1st, 12th, 10th, 8th, 6th, 4th, 2d and 13th Ahaues, making a complete epoch of 312 years. Their coming should not have been stated as the 6th, but the 11th Ahau, according to the explanation.

§6. In the 6th and 4th Ahau they again erected houses after they had lost Champoton, that is after a lapse of 48 years, which requires a connection with the 11th and 9th Ahau. This occurred in the years 888 to 936 A. D., for the 11th *Ahau* began in 888, the 9th in 912, and ended in the year 936 A. D.

§7. *In this Katun of the 2d Ahau, Ajcuitok Tutul Xiu established himself in Uxmal; the 2d Ahau, 13th, 11th, 9th, 7th, 5th, 3d, 1st, 12th and 10th Ahau, equal to 200 years, they governed in Uxmal, with the governors of Chichen-Itza and Mayapan.*

The former section closing with the 4th Ahau, this begins with the 2d and is followed in correct succession by the 13th, 11th, 9th, 7th, 5th, 3d, 1st, 12th and 10th, a space of 200 years. In the 2d Ahau, under their leader Ajcuitok, they settled down in a new region at the town of Uxmal. It appears that Chichen-Itza had been rebuilt, and Mayapan newly founded. Rulers resided at both places at peace with the Tutul Xiu at Uxmal.

Commentary of Señor Perez to Section 7.—In the 2d Ahau Ajcuitok Tutul Xiu made a settlement in Uxmal, and reigned there with the Governors of Chichen-Itza and Mayapan during 2d, 13th, 11th, 9th, 7th, 5th, 3d, 1st, 12th and 10th Ahau. A correction of these Ahaues gives us the 7th, 5th, 3d, 1st, 12th, 10th, 8th, 6th, 4th and 2d, and brings them into harmony with the Christian era, to wit: the years 936, 960, 987, 1008, 1032, 1056, 1080, 1104, 1128 and 1152 A. D. The 2d Ahau ended with the foundation and with the completion of 240 years in the year 1176, for the foundation took place in the year 936, when the 7th Ahau just now corrected began.

§8. *These are the Katuns*, 11*th*, 9*th and* 6*th Ahau* (*sic.*) *In the* 8*th the Governor of Chichen-Itza was deposed because he murmured disrespectfully against Hunac-eel. This happened to Chacxibchac of Chichen-Itza, governor of the fortress of Mayalpan. Ninety years had elapsed, but the tenth year of the* 8*th Ahau was the year in which he was overthrown by Ajzinte-yut-chan with Tzuntecum, Taxcal, Pantemit, Xuch-cuet, Ytzcuat and Kakaltecat. These are the names of the seven Mayalpanes.*

§9. *In the same Katun of the* 8*th Ahau, they attacked King Ulmil in consequence of his quarrel with Ulil, King of Yzamal ; thirteen divisions of troops he had when he was routed by Hunac-eel ; in the* 6*th Ahau the war was over after* 34 *years.*

As the foregoing section 7 closed with the 10th Ahau, we should expect section 8 to begin with the 8th Ahau. We read, however, 11th, 9th and 6th Ahau. This sequence is evidently incorrect in itself, because the 9th can never be followed by the 6th Ahau. If the period began with the 11th Ahau, the sequence should follow with the 9th and 7th Ahau. The correct reading of the text, however, will result from the examination of that which follows immediately after this introductory sentence. There we read these words: "In the 8th Ahau the governor of Chichen-Itza was deposed," etc., and this same 8th Ahau is mentioned again in the sentence that follows, beginning with "Ninety years," etc. So also it reappears for a third time in section 9, at its beginning. Now, as section 8 was expected to commence with the 8th Ahau, it is more than probable that the author has blundered in some way. We presume that instead of 11th, 9th and 6th, he intended to write 10th 8th and 6th. The 10th would indicate a reference made to the ending of the last section. The 8th and 6th are those in which all the events described in our two sections occur, for the insulted governor Hunac-eel of section 8 is the same who takes revenge in section 9.

This difficulty being removed, another arises, how to interpret the words "ninety years elapsed, but the tenth year of the 8th Ahau was the year in which he was overthrown," etc. This reads as if these ninety years were predecessors of the 8th Ahau. If this were so, they would fall in the 10th, 12th, 1st, 3d and the first half of the 5th Ahau. Of such Ahaues mention is made in the foregoing section 7. But we notice these Ahaues were passed in peace and not in war, as our passage evidently suggests. We cannot help thinking that another blunder is concealed in this phrase, and that the author meant to write *nine* years. If we write, *Nine years had elapsed, but the tenth year of the 8th Ahau was the year in which he was overthrown*, the idea of the author seems stated correctly. These nine years, then, would have fallen in the 10th Ahau, with which we proposed to commence section 8, and nine years added to the twenty years of the 8th Ahau, make twenty-nine years, and five more years of the 6th Ahau give those thirty-four years, which, at the end of section 9 are expressly indicated as passed in war. Such is the sense which we give to these two somewhat perplexing sections.

Commentary of Señor Perez to Sections 8 and 9.—The Ahaues 11th, 9th, 6th and 8th passed away, and in the latter the governor Hunac-eel of Mayapan overthrew Chacxibchac, the governor of Chichen-Itza, because he had spoken ill of him, and in the 10th year of the last Ahau, the seven chiefs of Hunac-eel overcame the governor Chacxibchac. If a correction is to be made it should then stand 13th, 11th, 9th and 7th Ahau, or the years 1176, 1200, 1224 and 1248 to the year 1272 A. D. Hence it was the year 1258, the tenth year of the 7th Ahau that Chacxibchac was overcome.

During the 8th Ahau occurred the destruction of the power of King Ulmil, because he had waged war against Ulil of Izamal, and Hunac-eel at the head of 13 divisions overcame Ulmil in the 6th Ahau. [We are unable to give the correction of Señor Perez, as we do not comprehend his text.]

§10. *In the 6th Ahau, 4th Ahau, 2d Ahau, 13th Ahau, 11th Ahau the fortified territory of Mayapan was invaded by the men of Itza under their king Ulmil because they had*

walls, and governed in common the people of Mayalpan; eighty-three years elapsed after this event, and at the beginning of the 11*th Ahau, Mayalpan was destroyed by strangers of the Uitzes or Highlanders, as was also Tancaj of Mayalpan.* *Years* 83.

§11. *In the* 8*th Ahau, Mayalpan was destroyed; the epochs of the* 6*th*, 4*th*, 2*d elapsed, and at this period the Spaniards, for the first time arrived, and gave the name of Yucatan to this province, sixty years after the destruction of the fortress.* *Years* 60.

In section 10 the 6th Ahau follows the 8th correctly, and the 4th, 2d, 13th and 11th Ahaues were passed in internal wars between Chichen-Itza and Mayalpan. In the 11th Ahau a highland people, called Uitze (probably Quiché), unite with the rulers of Chichen-Itza, and they then succeed in destroying Mayalpan. In section 11 another destruction of Mayalpan is reported. As this section begins with the 8th Ahau, and the foregoing ended with the 11th, a gap was left which represents the (9th), (7th), (5th), (3d), (1st), (12th) and (10th) Ahau. This gap undoubtedly means a period of great exhaustion to both contending parties, and as a second destruction of Mayalpan is reported in the 8th Ahau, we may fairly assume that this city had recovered, and in making a last effort to regain supremacy, was finally conquered. We understand the two reported destructions of this city as the heroic and victorious effort of the Maya race to exterminate the foreign Nahuatl invader, who, for a long period succeeded in taking a strong foothold in the country. In the succeeding epochs of the 6th, 4th and 2d Ahau, exhaustion from the war and disintegration must have ensued, for such was the condition in which the Spaniards found the Maya people in the following 13th and 11th Ahaues, which were the last they were allowed to count.

Commentary of Señor Perez to Sections 10 and 11.—In the 6th, 4th, 2d and 11th Ahaues the fortified land of Mayapan is attacked by the men of Itza and their king Ulmil, for it had walls, and the people

were governed in a community. The place was destroyed by foreigners from the Highlands in the 11th Ahau, and Tancaj of Mayapan was also conquered. The correction of the reckoning gives us the 5th, 3d, 1st, 12th and 10th Ahau. We have stated that the 5th *Ahau* began in the year 1272, and the others were consequently 1296, 1320, 1344, and 1368, and the 8th Ahau ended in the year 1392 A. D.

In the 8th Ahau Mayapan was destroyed, then followed the Katunes of the 6th, 4th and 2d Ahau, in which latter the Spaniards passed by and gave to the province the name of Yucatan. Hence, the Ahaues begin again their regular course, though it is a contradiction to say in the foregoing section that Mayapan had been destroyed in the 11th Ahau (corrected to the 10th *Ahau*). It would perhaps have been better to say it had been destroyed for the second time, possibly for the purpose of rebuilding it. The 8th Ahau began in the year 1392, the 6th, 4th and 2d Ahaues fell in the years 1416, 1440 and 1464, which last ended in the year 1488 A. D.

§12. *The* 13*th Ahau,* 11*th Ahau pestilence and small-pox were in the castles. In the* 13*th Ahau chief Ajpulà died. Six years were wanting to complete the* 13*th Ahau. This year was counted towards the east of the wheel, and began on the* 4*th Kan. Ajpulà died on the* 18*th day of the month Zip, on the* 9*th Imix; and that it may be known in numbers it was the year* 1536, *sixty years after the demolition of the fortress.*

§13. *Before the termination of the* 11*th Ahau the Spaniards arrived, holy men from the East came with them when they reached the land. The* 9*th Ahau was the commencement of baptism and Christianity; and in this year was the arrival of Toroba (Toral), the first bishop,* 1544.

After the 11th section had closed with the 2d Ahau, the 12th section correctly begins with the 13th Ahau, and the 13th and last section closed the manuscript with the 11th Ahau, when the government of the Mayas was brought to an end by the arrival of the Spaniards. The particular details contained in these two sections will be discussed hereafter.

Commentary of Señor Perez to Sections 12 and 13.—In the 13th and the 11th Ahaues pestilence and small-pox reigned. In the sixth year, before the expiration of the 13th *Ahau,* Ajpulà died at the time

when four Katunes were counted on the east of the wheel. His death happened on the 18th day of the month *Zip*, on the 9th day Imix. This date is wrong according to my reckoning; for the year 4 *Cavac* expired at the beginning and not at the end of the epoch, otherwise it would have been the year 4 *Muluc*. In the first case, the year 4 Cavac was that of 1496, in the other case it would be the year 1506, and never that of 1536, for in that year the 9th Ahau began.*

We give, besides, a recapitulation which Señor Perez himself added to his commentary, and for which we are indebted to the kindness of the late Dr. C. Hermann Berendt:—

"From what we have stated it will be seen that by only taking into account the number of epochs which are mentioned in the manuscript, and which elapsed between events, and by restoring this nomenclature according to the progressive series of the Ahaues, it appears that all indicated facts occur within the space of 58 epochs of 24 years each, which makes in all 1392 years to the expiration of the 11th Ahau. If we subtract these years from the year 1536, in which the 11th Ahau expired, 1444 A. D. remains as the year when the Toltecs seem to have arrived to colonize the country.

But if we allow the epochs and their enumeration to stand as they are, and in order to integrate the Ahaues in the sequence above indicated, add those which are missing, we should find that 97 epochs, each of 24 years had passed. The sum of 2328 years, represented by this count, is a space of time of too great magnitude to bring into harmony with Mexican history, and would signify that this country was 40 years older than the foundation of Rome, and 17 years older than the introduction of Greek Olympiads, which is very improbable.

Should any hypercritical person fail to believe in the list of epochs because their succession is incorrect, let him remember that the list has much to render it worthy of belief, though it must be subjected to corrections. Still less ought any one to refuse belief in the historical

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* Señor Perez in his commentary makes his calculation that 1496 was the year of the death of Chief Ajpulà, and succeeds in giving it a plausible appearance of correctness. But we observe that in order to reach this date he was not aware of having altered the words of the Maya text, and those of his own translation. This translation said correctly: "There were still six years wanting before the completion of the 13th Ahau." In the text of the commentary, however, we find him starting his count on the supposition that the original text was the sixth year of the 13th Ahau. Though this change is by no means allowable, he succeeds, ingeniously enough, in arriving at the year above quoted, and in stating also the dates of the day and month, precisely as the annalist had set them down.

statement of events. The manuscript indicates a traditional origin common to the history of all primitive nations. It is noticeable that no traditions exist to contradict the manuscript, and that it is the only one thus far discovered. The contents of the manuscript might be thus epitomized:—

1. The Toltecs occupied 4 epochs in going from their home to Chacnouitan. 144—217 A. D.

2. They arrived there in the first year of the succeeding epoch, and remained still 4 epochs more with their chieftain, Ajmekat Tutul Xiu. 218—360 A. D.

3. They discovered Ziyan-Caan or Bacalar and ruled therein 3 epochs, till they discovered Chichen-Itza. 360—432 A. D.

4. They remained at Chichen-Itza 6 epochs, till they set out to colonize Champoton. 432—576 A. D.

5. From the discovery of Champoton, which they colonized and ruled until they lost it, 13 epochs elapsed. 576—888 A. D.

6. They remain 2 epochs in the wilderness till they return again to Chichen-Itza. 888—936 A. D.

7. In the following epoch Ajcuitok Tutul Xiu colonized Uxmal, and ruled during 10 epochs in harmony with the governors of Mayapan and Chichen. 936—1176 A. D.

8. Three other epochs pass, and in the 10th year of the following epoch Chacxibchac, ruler of Chichen, was defeated by Hunac-eel, ruler of Mayapan, and his captains. 1176—1258 A. D.

9. In the same epoch of the defeat of the ruler of Chichen they marched against Ulmil, who was king in the same Chichen, because he had waged war against Ulil, king of Izamal, which war Hunac-eel, brought to a close in the following epoch. 1258—1572 A. D.

10. In spite of Ulmil's defeat this ruler of Chichen planned an invasion of Mayapan. After the lapse of 2 more epochs, and in the third year of that which followed, Mayapan was destroyed in the year 1368 by strangers who came from the mountains. 1272—1392 A. D.

11. Besides the three named epochs, and indeed in the last of them, the Spaniards passed along, who gave to the province the name of Yucatan. 1392—1488 A. D.

12. In the following epoch an epidemic reigned even in the temples and fortified places, and in the 6th year Ajpula died on the 11th of September, 1493. 1488—1512 A. D.

13. In the 11th and last epoch (1536—1576) the conquerors arrived, to wit: in 1527, and in the following the first Bishop came, in the year 1541, and the conquest was completed in 1560 A. D.

Thus much I have been able to bring to light in this matter. But with the help of dates, which I do not possess, and with that of the travels you have made in our country, the information which you have gathered

must have enlarged your ideas on this subject, and I wish you would be so kind as to communicate them to your most devoted

F. I. JUAN PIO PEREZ.

Peto, April 2, 1842.

MR. J. LLOYD STEPHENS."

CONCLUDING REMARKS.

It will be noticed from the text of the Manuscript, that no events are commemorated but such as are connected with *war*. In this style also the Nahuatl annals were drawn up. With both nations *war* was recognized as the only fact worthy to be kept in the memory of the coming generations. Nor does the author state whether the country was ruled by kings or an emperor. It is rather suggested (section 7) that the tribes were gathered in groups, with a large town as a centre, and this town was governed by a priest. The words *halach uinicil*, *holy men*, were somewhat too freely interpreted with *governor* by the translator. In regard to the considerable gaps in the sequence of years in the manuscript, we will not longer attribute them to a lack of memory on the part of the author, but to the custom generally observed among the annalists to be regardless of any work of peace performed by the nation; and whenever the question shall be discussed, at what epoch the building of the huge pyramids and temples took place, these dates will contribute to the answer. Periods of peace certainly began with years of great exhaustion; but recovery must have ensued, and the unshaken energy of the people and their leaders must have been directed to the undertaking of works, in which they could exhibit also their taste for pomp and architectural achievements. The gaps, therefore, instead of casting a shadow upon the authority and completeness of the manuscript, may rather be thought to perform the silent office of throwing light into the obscure past of the Maya history. As to the method, however, which we employed in comput-

ing the omitted periods of Ahaues, we have only to say that it grew out from the nature of the Maya enumeration itself. The two ends of the interrupted series being given, the number of the intervening Ahaues could be easily supplied.

What now remains is, to discover for the restored and completed series of Ahaues the corresponding chronological expressions in our era. We find the total Ahau periods mentioned in the annals were 50. We have thought it necessary to complete twenty more periods, so that we have seventy periods (20×70), or 1400 years. As soon therefore as we know in which year of our era the last or 13th Ahau mentioned in the manuscript fell, we can, by reckoning backward, find the years date of the first Ahau mentioned, to wit: the 8th Ahau, and also determine the dates and events of each of all the other intervening Ahaues. The manuscript fortunately affords us the necessary material for determining with incontestable certainty the years date of the last 13th Ahau. It is the following: we read in the 12th section that Chief Ajpulà died in a year when there were still six years wanting before the expiration of the 13th Ahau, and that the year of his decease was 1536 A. D.

According to this statement the 13th Ahau ended with the year 1542. Bishop Landa (see §41 of his Relacion de las Cosas de Yucatan) confirms the correctness of the above calculation, though he says that the 13th Ahau expired with the year 1541. Landa undoubtedly selects this date of June 10th, 1541, as that of the last decisive victory at T'ho over the Indians, while the author of the manuscript may have had in mind the date when Mérida was officially incorporated as the capital, and a dependency of the Spanish crown, which was January 6, 1542.* If we subtract the total number of Ahaues already obtained, and amounting to 1400 years, from the year 1542, we obtain for the first epoch

* Eligio Ancona, Historia de Yucatan, Mérida, 1879, Vol. I., page 333.

named in the manuscript which is the 8th Ahau, or the starting of the conquerors from Tulapan, the years 142—162 of our modern Christian era.

Of all the dates calculated from the manuscript only that of 1542 is well established from a historical point of view, as that when Mérida was declared the future capital of the conquered country. It is represented by the last year of the 13th Ahau. A second date and event, that of the final destruction of Mayapan, is mentioned by Cogolludo, who places it about the year 1420 A. D., which would give (see table, page 96) a 12th or a 10th *Ahau* period. But the manuscript in §11 gives *Vaxac Ahau*, or the 8th *Ahau*, which according to our computation represents the years between 1442 and 1462. Landa agrees with this statement (Relacion de las Cosas de Yucatan, §IX., page 52). "*It is now* 120 *years since Mayapan was destroyed.*" Landa wrote in the year 1566, therefore, in his conception Mayapan was destroyed in 1446, which year falls correctly in the 8th *Ahau*.

Landa's account agrees also with another event mentioned in the manuscript, the wanderings of the Itzaes 40 years in the wilderness before they settled down at Uxmal and Mayapan, in the 6th and 4th Ahau, which is in our calculation from 942—982 A. D. Landa, however, does not fix the year (Relacion de las Cosas de Yucatan, §VIII., page 46). In §VIII., page 49, he likewise speaks of a king of the tribes of Cocomes, hostile to the Itzaes, who kept a Mexican garrison in Mayapan. This is an allusion to the seven Mayapanes mentioned in the manuscript (in §8), all of whom have Mexican (Nahuatl) names. There also the year is not given. However, his confirmation of so early events in Maya history appears to be of high value.

It is fortunate that the manuscript just in the middle of its narration exhibits a long succession of Ahau periods without any gaps at all. We can count through sections 5, 6, 7, 8, 9 and 10, thirty-one *Ahau* periods or 620 *years* of uninterrupted history. They represent, according to our

calculation, the epochs from the years 682—1302 A. D., or from the taking of Champoton to the first destruction of Mayapan by the assistance of the foreign Uitzes. This compact period of time touches a very remote epoch in the history of the civilized nations of Central America. It reaches backwards to an epoch when in Europe, Pepin D'Heristal and his family laid the foundation to their future ascendancy on the throne of France. If we look still further backward in our table, we notice another long period of time (sections 3 and 4) which represents the sum of eight uninterrupted Ahaues, equal to 160 years. The connection of these two great periods was re-established by the interpolation of the three Ahaues, 8, 10 and 12 in section 5, a correction for which there should be not the least question. Groping our way, we should reach the epochs when Bacalar was founded, with a date as early as between 462 and 482 A. D. At this point we are no longer able to follow the conquerors on their route. The location of Bacalar is well known to us, but that of Chacnouitan and Tulapan has escaped our investigation. Notwithstanding, by the aid of the quoted Ahaues we are able to fix the time for the long rest and residence in Chacnouitan, and for their remote starting from Tulapan. It comprises the epochs backwards from the year 462 to that of 162, and since the text reports that eighty years were spent in the migration, we are entitled to fix the time for the arrival in the peninsula with the year 242 A. D. It is of significance for our purpose, that this settling on the peninsula can be computed with the year 242 A. D. It represents, as will be seen, the 13th Ahau, a date always assumed by the Maya chronologists as one with which they designate the commencement of a new cycle.

The following table contains a chronological translation of the Ahaues as they correspond with the years of our Christian era. Accordingly, the historical events would correspond to the following dates of our Christian era:—

Sections of the Manuscript.	Ahaues.	
§ 1	8, 6, 4, 2.	Passed in the migration of the conquerors from Tulapan, ... = 162, 182, 202, 222.
§ 2	(13), (11), (9), (7), 5), 3), (1), (12), (10), 8, 6.	Their stay in Chacnouitan,=242, 262, 282, 302, 322, 342, 362, 382, 402, 422, 442.
§ 3	(4) 2, 13.	They take Bacalar, ... = 462, 482, 502.
§ 4	11, 9, 7, 5, 3, 1.	Settlement at Chichen-Itza and its destruction, = 522, 542, 562, 582, 602, 622.
§ 5	(12), (10), (8), ...	En route for Champoton, . . . = 642, 662, 682.
do.	6, 4, 2, 13, 11, 9, 7, 5, 3, 1, 12, 10, 8, .	In Champoton, = 702, 722, 742, 762, 782, 802, 822, 842, 862, 882, 902, 922, 942.
6	6, 4, ...	They lose Champoton twice, . . . = 962, 982.
§ 7	2, 13, 11, 9, 7, 5, 3, 1, 12, 10, . . .	Uxmal, Mayapan and Chichen-Itza in league,=1002, 1022, 1042, 1062, 1082, 1102, 1122, 1142, 1162, 1182.
§§ 8 and 9	8, ...	War between Chichen-Itza and Mayapan, =1182—1202.
§10	6, 4, 2, 13, 11, ...	The war continues; the Uitzes help in the destruction of Mayapan, = 1222, 1242, 1262, 1282, 1302.
§11	(9), (7), (5), (3), (1), (12), (10), 8, . .	Mayapan destroyed again, = 1322, 1342, 1362, 1382, 1402, 1422, 1442, 1462.
do.	6, 4, 2, ...	The Spaniards make their appearance in Yucatan,=1482, 1502, 1522.
§§ 12 and 13	13, ...	Beginning of the propagation of Christianity, . = 1542.

It will be noticed that the result obtained by our computation is almost identical with that of Señor Perez. In his conception the manuscript comprises the epoch from 144—1536 A. D.; in ours, that from 142—1542. A coincidence like this may be thought to justify the conclusion that although we differed in our methods of interpretation and reckoning, the agreement of the results appears so much the more satisfactory. We should be pleased to view the subject in so favorable a light, but fear we cannot. For, whilst, on the one hand, we are far from claiming any infallibility for our *modus procedendi*, on the other hand, we cannot help protesting against Señor Perez's methods of obtaining his results. Besides giving to the Ahau the not admissible duration of 24 years, he further makes an evident mistake in the summing up of the Ahaues quoted in the manuscript, by counting 58 of them instead of 50. He does not seem aware that the Maya author mentions various of these Ahaues twice, and even thrice, a fact which we took care to point out in the course of our discussion. It is only by increasing the length of the Ahau to 24 years, and also by counting 8 Ahaues more than there actually were, that Señor Perez is able to arrive at the date of 144 A. D. for the exodus from Tulapan. If we should indeed incline to make allowance for his choice of the 24-year period, because as it seems to us he was misled by his authorities, he notwithstanding must be held accountable for the mistake made in *counting in* those eight ill-starred Ahaues. His computation therefore being defective in itself, the favorable impression gained from the fact that two interpreters arrived at an almost identical result, will disappear. Such an agreement would have been very valuable if either of the two interpreters could show that his method stands the test of incontrovertible proof. Therefore, it is only by chance that Señor Perez's mistakes in reckoning make up very nearly the same number of years that we have obtained; first, by means of the interpolation of 20 more Ahaues; and second, by allowing only 20 years for each Ahau period.

In conclusion it may be proper to make some statements as to the position which this manuscript holds in aboriginal literature, and also as to its value and use as a chronological document. In the first place we are fully convinced of its genuineness. We have not been able to examine the document itself as to the material upon which it was written, nor as to the characters of the text, nor as to external appearance, and we are not informed into whose hands it fell after it left those of its author before it came into the possession of Señor Perez. But we believe that Señor Perez had good reasons for regarding it as a document prepared in the last half of the 16th century, at a time near to that when Yucatan was conquered by the Spaniards. The language and construction belong to that epoch, as we are told. But even if it should not be an original, but a second or third copy, this would not be enough to shake our faith in the authenticity and importance of its contents. For setting aside the fact that its matter has a specific national character, and presupposes a knowledge on the part of its author which only a native could have obtained, the style of its composition indicates its national bearing.

Let us fancy ourselves in the position of the Maya writer while at work. Before him, on the table, stands the wheel for counting the Ahaues, and as he bends over the sheets containing the painted annals, his eye turns alternately from the paper to the wheel, making a careful comparison. Then he pauses and considers in his mind what expressions he must use, and afterwards begins to write. From time to time he cannot forbear, however, casting an occasional glance at the letters of the Spanish alphabet, in order to shape them correctly, for he is still a beginner in this new art. Now, perhaps he wavers for a moment, and then begins anew. The recollection of some ancient Maya song steals in upon his mind, and by the aid of a few significant sentences he incorporates the substance with his text. To interpolations of this kind we may attribute such phrases as "the disre-

spectful utterances of Chacxibchac against Hunac-ceel." Of the ancient Maya ballads, it is to be regretted, none are known to exist. Yet there is no reason for relinquishing the hope altogether, that some day, at least, a copy of the painted annals, which our Maya writer evidently consulted, may be discovered, while we can willingly dispense with the ballads.

As long as such hopes fail of realization, we must be satisfied with the slight, but yet important, contribution offered us in the manuscript. We may complain of its brevity, yet notwithstanding it is the most complete document we possess of ancient American history. It is all the more important for the reason that it relates to Yucatan, which in our opinion, is the *very cradle* of early American civilization. It is also pleasant to observe that the manuscript is not at variance with what we have learned from the fragmentary records made by Landa, Lizana and Cogolludo. Notwithstanding its imperfections, it interprets and explains much that had hitherto appeared uncertain and deficient. It is of undoubted authenticity, and forms a firm foundation for the reconstruction of the history of the past, which till now has remained enigmatical, and which is faintly expressed by the crumbling ruins of the peninsula.

The manuscript, finally, affords a guarantee that the long past not only reached back to the remotest epoch of our era, but that more than all, it stands in a near, perhaps in the most intimate, connection with the history of the Nahuatl race. In reference to the homogeneous structure of the Maya and Nahuatl calendars we have already expressed our belief that these two nations were closely related to each other. In the traditions of both occurs the name of Tula or Tulapan, as a fatherland common to each of them.* This supposition

*With reference to the Mayas, consult the Quiché traditions in Brasseur de Bourbourg's Popol Vuh, pages 215, 217 and 236, and Brasseur de Bourbourg's Memorial of Tecpan Atitlan, page 170, note 3. For the Nahuatl race, Brasseur de Bourbourg's Histoire des Nations civilisées du Mexique, Vol. I., Appendix, page 428, in extracts made from the Codex Chimalpopoca.

appears to us still further justified by the circumstance that the chronological annals of both nations revert to the same period of time as a starting point. As regards the Nahuatls, we refer to the circle of signs engraved on the Calendar Stone which gave us the information that the annalists of Anahuac in the year 1479, counted back twelve hundred and forty-eight years to the celebration of their first festival in honor of the sun ; that is, they carried back their political or religious record to the year 231 A. D. The Maya manuscript corresponds to this date, as we think, since the year 242 A. D. resulted from our calculation. It was the year in which the ancient conquerors, after wandering 80 years,

THE MAYA AHAUES OF THE MSS., BROUGHT INTO CORRESPONDENCE WITH THE YEARS OF THE CHRISTIAN ERA :—

Ahaues.	Before Christ.	Ahaues.	Christian Era.		Ahaues.	Christian Era.		Ahaues.	Christian Era.	
10	118	11	262	I. Ahau Katun.	11	782	III. Ahau Katun.	11	1302	V. Ahau Katun.
8	98	9	282		9	802		9	1322	
6	78	7	302		7	822		7	1342	
4	58	5	322		5	842		5	1362	
2	38	3	342		3	862		3	1382	
13	18	1	362		1	882		1	1402	
Ahaues.	Christian Era.	12	382		12	902		12	1422	
		10	402		10	922		10	1442	
		8	422		8	942		3	1462	
		6	442		6	962		6	1482	
		4	462		4	982		4	1502	
		2	482		2	1002		2	1522	
		13	502		13	1022		13	1542	
11	2	11	522	II. Ahau Katun.	11	1042	IV. Ahau Katun.			
9	22	9	542		9	1062				
7	42	7	562		7	1082				
5	62	5	582		5	1102				
3	82	3	602		3	1122				
1	102	1	622		1	1142				
12	122	12	642		12	1162				
10	142	10	662		10	1182				
8	162	8	682		8	1202				
6	182	6	702		6	1222				
4	202	4	722		4	1242				
2	222	2	742		2	1262				
13	242	13	762		13	1282				

arrived on the Island of Chacnouitan where they made a permanent settlement. This event happened in the 13th Ahau (see table), which, as we know, is the starting point of Maya chronology, and likewise the first date of that name which the manuscript mentions. The difference of 11 years which appears in the Nahuatl computation cannot be regarded as of much importance.

If, however, it should seem desirable to examine chronological parallels we shall refer our readers to a second chapter on Central American chronology which is hereafter to appear, in which we propose to undertake the task of illustrating and explaining still further the parallelism of Maya and Nahuatl dates. It will then be proved that in this written and still existing Nahuatl chronology, supported by the date 231 A. D., found on the Calendar Stone, a still earlier date designated as *X Calli* can be found, which represents the year 137 A. D. In this year, according to the annals, a great eclipse of the sun took place, with the remarkable statement that it occurred exactly at the end of a year at 12 o'clock noon. In our manuscript we find the first date preceding the settlement of Chacnouitan designated with the 8th Ahau, the date of the setting out from Tulapan, which we have already stated to be the years 142—162 A. D. Another agreement is that the Nahuatl records show that 166 years before the occurrence of the above mentioned eclipse of the sun in the year 1 *Tecpatl*, a congress of astrologers to amend the calendar of the nation took place at a town called Huehuetlapallan, and by reckoning back we find that this year corresponds with the year 29 B. C. If we then follow a hint which Señor Perez has very ingeniously furnished that the manuscript strangely begins with an 8th Ahau instead of a 13th Ahau, and that the Maya chronology could be dated back to such a 13th Ahau as a proper beginning connected with some interesting event, we find by reckoning back from the 8th to the 13th Ahau the corresponding date to be the years 18—38 B. C.

Now, the results gained in this line of investigation, can be formulated as follows:—

1. That the conquerors and settlers of the Yucatan peninsula, as well as those of the Anahuac lakes, were joint participants in a correction of their national calendar about the year 29 B. C.

2. That about the year 137 A. D., when a total eclipse of the sun took place, the ancestors of both nations set out from their common fatherland, Tula or Tulapan.

3. That about the year 231 A. D., both nations made their appearance on the coast of Central America, and succeeded in conquering a large portion of the peninsula.

It is true that we have only documentary evidence to substantiate the theory just referred to. But, if we do not possess the desirable evidence of monumental inscriptions, it behooves us to examine and to weigh carefully that which still remains. In this connection we should also remember that the sculptor, in carving his records, was not guided by his memory alone, but that he copied the symbols from the sacred books of his race; and that on the other hand, our learned Maya writer, when translating these latter into written phonetic language, drew his text, as did the sculptor from similar sources.

If therefore with the help of written records we can build up hypotheses partially satisfactory, and not altogether improbable, we have accomplished all that could be expected for the present, at least, and have perhaps excited an interest in a branch of history which has hitherto been held as dead and unproductive.

In conclusion, we would express the hope that the Maya manuscript may be submitted to a rigid critical and linguistic examination, and that the publication of the work may be appended to a heliotype copy of the original in order to exhibit to students a document of so great importance, and to ensure its preservation.

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